

# 1992 Annual Report

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**Division of  
Fisheries & Wildlife**

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# The Board Reports

George Darey  
*Chairman*

The Massachusetts Fisheries and Wildlife Board is a group of seven persons, each selected for a demonstrated interest in wildlife. By law, the persons appointed to the Board are volunteers, receiving no remuneration or expenses for their service to the Commonwealth. Five of the seven are selected on a regional basis, with one member, by statute, representing agricultural interests. The two remaining seats are held by a professional wildlife biologist or manager, and a representative with a specific interest in the management and restoration of those wildlife populations not classified as "game species." Each member is appointed by the Governor to a five year term. The Board oversees operations of the Division of Fisheries and Wildlife, reviews programs and sets policy and regulations pertinent to wildlife in the Commonwealth.

During this fiscal year the Board continued to hold monthly meetings at locations around the state, hold public hearings on proposed regulatory changes, and address issues of specific concern. While many different matters and issues were brought before the Board this year, most of its time was spent in scrutiny and review of Division programs and proposals for regulatory changes. Among the items examined were:

**Endangered & Threatened Species Regulations:** The Board spent a considerable amount of time reviewing and considering proposed regulations for the Endangered and Threatened Species Act. The Board was well aware of the magnitude of these regulations which will have a profound effect over how the state's wildlife resources are preserved and protected for at least the next several decades. In recognition of this, the Board scheduled two public hearings to solicit public comment on establishing rules and regulations relative to the listing of endangered, threatened, and special concern species, the taking and possession of such species, designation and alteration of significant habitats, and other regulations necessary to implement the provisions of Chapter 131A.

After considerable discussion and some adjustment based primarily on public comment, the Board voted to accept the regulations as drafted. The draft document was then sent to the Committee on Natural Resources for the 60 day review period as mandated by statute. In December, the Board voted unanimously to adopt the proposed Endangered Species Regulations, and to rescind 321 CMR 8.01 and replace it with the new official list of endangered, threatened and special concern species (321 CMR 10.60). All cross references to the previous list were also changed to reflect the adoption of the new list.

A tremendous amount of work went into preparing these regulations and the Board particularly wishes to praise Director MacCallum, the Endangered Species Technical Advisory Committee, Dr. Thomas French, Henry Woolsey, Jay Copeland and Division staff who were involved in preparing these regulations.

**Deer Management:** The Board considered and approved the number of antlerless deer permits to be issued for the 1992 hunting season. In addition, it held a public hearing to discuss the repeal of special deer hunting regulations in effect at the Crane Beach and Wildlife Refuge, and possible changes to special regulations relative to the controlled hunt at Quabbin reservation. The vote will be taken early in the next fiscal year.

The Board was pleased to note the unqualified success of the controlled Quabbin deer hunt this year, and commends the Division staff and the MDC for their cooperation in making this an exemplary deer management program.

**Public Comment Period:** Following a discussion and a review of its options, the Board voted to provide a ten day calendar period following a public hearing during which the Board would accept written public comment.

**Waterfowl Management:** The Board set waterfowl seasons and bag limits within the federal framework during a public hearing



held in August. This was a particularly important selection, as the Division is entering into a five year program and the type of season selected this year will be maintained for the next five years.

**Personnel Actions:** As overseer of the operations of the Division of Fisheries and Wildlife, the Board votes confirmation of hirings, promotions, retirements and other personnel actions within the Division. This was a trying year, as the Division lost two outstanding employees who resigned to take positions with other state wildlife agencies: Assistant Director Dr. Steven Williams resigned to take a position with the Pennsylvania Game Commission, and Wetlands Ecologist Dr. Steven Roble resigned to take a position with Virginia's Natural Heritage Program. Following a nationwide search for a new Assistant Director, the Board voted to hire Dr. Robert Deblinger as Dr. Williams' replacement. Dr. Roble's vacant position has not yet been filled at this time.

During the year the Board presided over seven new hires and five promotions.

**Furbearer Management:** The Board heard a proposal to require mandatory tagging of mink pelts, and following a July public hearing concerning this proposal, voted to change furbearer regulations to require the tagging of mink pelts.

**Baitfish Regulations:** The Board spent considerable time reviewing baitfish regulations, and held a public hearing on various proposals relating to this subject in January. However, as Division staff requested more

time to investigate certain areas relative to the proposed regulations, the Board voted to postpone a vote on baitfish regulations until August.

**Other Activities:** In the course of reviewing Division projects and programs the Board addressed numerous other issues, including promotion of the Wildlands Fund and the Natural Heritage Fund. As part of this process the Board accepted a proposal from Randy Julius of East Bridgewater to prepare and market a series of art prints to accompany the Wildlands Stamp.

The Board also held a meeting with the Environmental Management Board which was beneficial because the Department of Environmental Management manages large areas of recreational and forest lands. Board members indicated that they were particularly pleased to learn of the Governor's signing into law the Commonwealth's Hunter Harassment Bill (see Legislative Section.)

The Board was deeply concerned over the incident of arson at the Ayer Game Farm and will take the entire pheasant rearing program under review in the near future. While the Board was concerned and saddened about the damage to the Sandwich Hatchery and the Southeast District caused by Hurricane Bob, they went on record as commending Sandwich Hatchery personnel for doing an outstanding job of maintaining both fish and facilities under exceptionally difficult circumstances.



On New Year's Eve of 1991 arson hit the game farm at Ayer, destroying a number of buildings.

**Massachusetts Fisheries & Wildlife Board**

George L. Darey, Lenox, *Chairman*  
Nancy Begin, Topsfield, *Vice Chairman*  
John F. Creedon, Brockton, *Secretary*  
Gwilym S. Jones, Framingham  
Michael P. Roche, Orange  
Ernest W. Foster, Jr., Worcester  
Russell A. Cookingham, Monument Beach

**Administration**

Wayne F. MacCallum  
*Director*

John Buckley  
*Deputy Director*  
*Administration*

Carl S. Prescott  
*Deputy Director*  
*Field Operations*



# Fisheries

Dr. Mark S. Tisa  
*Assistant Director for Fisheries*

The Commonwealth's aquatic resources include a variety of both lotic and lentic fisheries habitat ranging from coldwater, wild trout fisheries to warmwater panfish fisheries. There are approximately 2,675 lakes and ponds, totaling about 142,681 surface acres. Ponded waters are mostly less than 500 acres in size. The two largest bodies of water, both man-made drinking water sources, are the Quabbin (25,000 acres) and Wachusett (5,000 acres) Reservoirs. Angler access is partially restricted on both reservoirs. The largest river in Massachusetts is the Connecticut River with 72 miles (7,284 acres) transecting the Commonwealth. The 2,027 named streams flow about 10,704 miles and comprise approximately 14,900 acres. The protection, management and enhancement of these inland fisheries resources and their associated habitats involves several ongoing fisheries projects.

## Warmwater Fisheries Investigations

There were major changes in the warmwater fisheries program in 1992. In November, the Division hired a full-time warmwater project leader and an assistant project leader. This helped to solidify the Division's commitment to the most effective management of the Commonwealth's warm and coolwater fisheries resources.

Angling pressure directed at the state's warm and coolwater fisheries has increased dramatically over the past 10 to 15 years, with the majority of this pressure currently directed at black bass and esocids. Therefore, one of the first orders of business for the newly hired biologists was to establish management goals and objectives for the Commonwealth's major warmwater sportfish: namely black bass (large and smallmouth bass) and esocids (particularly northern pike and tiger muskellunge).

From this need to evaluate the increase in fishing pressure and any subsequent effect it may be having on the respective fisheries, a five year plan was established. The plan is designed to evaluate the status of warm and coolwater fisheries across the state's

five Wildlife Management Districts, and determine the impact of our current management regulations, fishing pressure and stocking on those fisheries.

For black bass, this plan consists of a four part approach; a statewide bass population survey, a statewide bass creel survey, bass population computer modeling and an assessment of alternative bass management regulations.

Beginning in the spring of 1992, bass lakes across the state were sampled by electrofishing at night to determine such population indices as relative abundance, growth rates, age and size structure, recruitment, relative weights, mortality rates and exploitation. Sampling was scheduled to coincide with bass spawning periods to assure a large sample size and a variety of year classes. This initial sampling also helped to establish standard sampling procedures to be used by the fisheries staff from the Westboro Field Headquarters as well as all five of the state Wildlife Management Districts. This spring sampling resulted in data on 10 of the state's major bass lakes. Data analysis of these lakes will be accomplished with the aid of a newly acquired computer software package and digitizing system. This type of sampling will continue on an annual basis to build on the existing statewide data base.

In addition to the spring sampling, plans have been made to conduct winter creel surveys on a number of these waters to aid in determining the pressure directed at bass, as well as catch and harvest rates. These creel surveys will also be ongoing.

Based on the data generated by the spring population sampling and winter creel surveys, computer modeling will be used to determine the best management options for individual waters. This analysis will then be used to choose candidate lakes for assessment of alternatives to our current regulations, such as the establishment of trophy or slot length limits.



The management plan for our two hatchery-reared esocids, northern pike and tiger muskellunge, consists of a three part approach: a statewide northern pike and tiger muskellunge population survey, a statewide northern pike and tiger muskellunge creel survey, and the development of a consistent esocid stocking protocol.

As with black bass, the statewide esocid survey will be used to estimate current population parameters, while the creel survey will help establish pressure directed at these fish as well as catch and harvest rates. The survey work will consist of spring and fall sampling using electrofishing, fyke nets and gill nets, and will commence in the fall of 1992. Information generated as a result of each of these approaches will be used to establish the most effective stocking protocol for increasingly important gamefish.

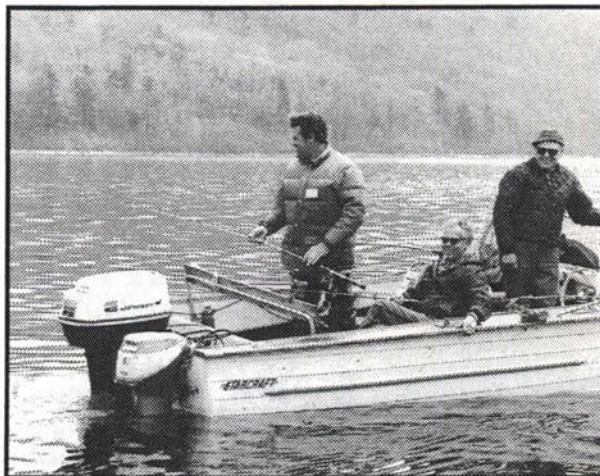
### **Anadromous Fish Investigations Connecticut River**

The Massachusetts Division of Fisheries and Wildlife through the Massachusetts Cooperative Fish and Wildlife Research Unit at the University of Massachusetts continues fish passage monitoring and other field efforts on the Connecticut River Anadromous Fish Restoration Program.

Returns of Atlantic salmon and American shad to fishways on the Connecticut River in Massachusetts reached record levels in 1992. The number of Atlantic salmon fry released into Connecticut River tributaries within the Commonwealth remained the same as in 1991, at about 450,000. The first salmon collected for brood stock purposes from the Westfield River was taken in 1992. Great progress was also noted in the area of downstream fish passage facility construction. Prototype facilities designed to provide safe passage around the hydroelectric turbines at Holyoke and Turners Falls were successfully tested with Atlantic salmon and shad during 1992. Permanent facilities will likely be constructed at both locations in the next few years. Connecticut River shad continue to be in high demand as the brood stock source for other restoration programs in the Northeast. Eggs, as well as live adults, were collected and transported for shad restoration programs in Pennsylvania, Maine and New Hampshire.

A total of 368 Atlantic salmon were counted at the Holyoke Dam Fishlift in 1992. This was the highest number of Atlantic salmon returning to Holyoke in the history of the program. Thirty-six salmon were released for upriver passage, the remaining 332 salmon were trapped and transported to the U.S. Fish and Wildlife Service's Richard Cronin National Atlantic Salmon Station in Sunderland, Massachusetts for use as brood stock. Fourteen of the salmon released at Holyoke were known to have successfully passed through the Turners Falls Gatehouse Fishway.

The number of American shad passed at both Holyoke and Turners Falls was also the highest in the history of the program. Over 720,000 American shad were passed at Holyoke and over 60,000 at Turners Falls. In addition, about 6,800 shad were trapped for out-of-basin restoration efforts



in the Merrimack River, New Hampshire; Charles River, Massachusetts; and Kennebec River, Maine.

The creel survey of shad anglers was expanded to include the Chicopee River as well as the Westfield River and Connecticut River below the Holyoke Dam. Harvest was estimated at 1,859 shad in the Chicopee, 6,095 in the Westfield and 90,823 in the Connecticut. Results of the survey suggest that more and more Bay State anglers are taking advantage of this unique sport fishery.

The Atlantic salmon fry stocking program received a boost with the donation of salmon egg incubators from the New England Salmon Association. The incubators will be put to use beginning in the fall of 1992 when the salmon held at the Roger Reed State Salmon Hatchery are spawned. The new



incubators increase the Facility's egg incubation capability to one million. Most fry continued to be stocked into the Westfield River Basin in 1992 (418,300). The remaining 34,000 fry were stocked into the Deerfield River Basin. Salmon habitat in several tributaries of the Deerfield River were mapped in 1992. This data will be added to existing data collected in 1991 to provide the basis for future fry stocking recommendations.

### **Merrimack River**

A record 20,801 American shad were passed at the Lawrence Fishlift in 1992. This exceeded the 1986 count (18,173) and was probably due to the extended fish lift day initiated in 1992. The new lift day adds four hours of lift time each day. The lift is now operated from 6 AM to 7 PM during the main portion of the run. The new lift day was also employed at the Lowell Fishlift in 1992. The result was a record number of shad being passed through the facility (6,338). This number was estimated using counts made by staff and estimates from video tapes of times when no staff were present. The video taping system was so successful that plans are being made to add another camera so that the fishway at the Pawtucket Dam in Lowell can be monitored in the same way. The video equipment was loaned to the Division from the U.S. Fish and Wildlife Service.

The number of returning Atlantic salmon was down in 1992 (197). However, the estimated return rate from smolts produced from fry releases and smolts reared in the hatchery was similar to other years. The salmon were transported to the Nashua National Salmon Station for spawning in the fall of 1992.

A major breakdown in the Lowell Fishlift occurred on June 2nd when a metal screen broke, causing the fishlift to be inoperable for 17 days. Subsequent meetings with the dam owners have resulted in a new maintenance schedule for the fishlift and alternate plans for fish passage should such an unexpected event occur again.

### **Whetstone Brook**

The field work on Whetstone Brook, which started in 1985, was completed in October 1991. Final sample work-ups and data analysis were completed in May 1992. The final report is expected to be completed in September 1992.

Whetstone Brook was a joint federal and state project funded through the National Acid Precipitation Assessment Program's Acid Precipitation Mitigation Project (APMP), which is administered by the U.S. Fish and Wildlife Service. Data from the Whetstone Brook project were used by the U.S. Congress for drafting the new Clean Air Act of 1990. Whetstone Brook was chosen as the study stream in Massachusetts because fisheries and water chemistry data showed that it had been impacted by acid precipitation. Whetstone Brook had once been considered a prime wild trout stream, but starting in the late 1970's the natural fish populations declined and water conditions were such that trout stocking had to be delayed until after the spring highwater period.

The purpose of the Whetstone Brook study was to determine the effectiveness of adding calcium carbonate to neutralize waters impacted by acid precipitation. A water-powered device designed to automatically dispense limestone into Whetstone Brook, installed in April 1989, continued to operate successfully into 1991. This device, which was specifically designed for use on Whetstone Brook, has functioned almost perfectly since going on-line, and the liming goals of the project have now been met. The extensive data collected show that the stream pH has returned to safe levels and toxic aluminum concentrations have been reduced. Buffering capacity and calcium levels also increased during liming. Other aspects of the water chemistry did not change in response to liming. Increases in the population size, survival and health of brook trout and brown trout also occurred during liming. No significant changes in the species composition or size of the invertebrate population were detected.

### **Quabbin Reservoir**

Fifty-four Quabbin lake trout qualified for Sportfish Award pins in 1992. The ten largest ranged from 14 lbs. 9 oz. to 20 lbs. 4 oz. Additionally the creel agent reported many landlocked salmon over 4 lbs. taken, with the largest two recorded at 5 lbs. 0 oz. and 5 lbs. 14 oz. During early May 15,500 7" landlocked salmon yearlings were stocked from the Roger Reed Salmon Culture Station in Palmer. Approximately half of these fish originated from eggs collected from wild landlocks by New Hampshire Fish & Game personnel at Lake Winnepesaukee and the other half were taken from captive



broodstock maintained at the State of Maine Hatchery at Grand Lake Stream. Both strains are being monitored at the hatchery and in the reservoir to compare survival and rate of growth. Another 15,000 landlocks (7,500 from Lake Winnepesaukee eggs and 7,500 from Grand Lake Stream eggs) were raised at the Roger Reed Station and released into Quabbin in May 1993.

In the warmwater gamefish category the largest Quabbin bass recorded was a 7 lb. 9 oz. largemouth. Additionally a 6 lb. 7 oz. smallmouth was taken followed in size by 7 other "large" smallmouths ranging from 4 lbs. 8 oz. to 5 lbs. 1 oz.

In the large panfish division Quabbin provided anglers with numerous bullhead and white perch over one and a half pounds, the largest of each species being 2 lbs. 4 oz. Six black crappie taken registered from 2 lbs. 2 oz. to 2 lbs. 12 oz.

In the Massachusetts Division of Fisheries and Wildlife's Sportfish Award Program, Quabbin Reservoir provided anglers with fish which qualified for 83 awards.

## **Environmental Review**

### **Contaminants in Fish**

In comparison to FY91, there was a marked increase in the time spent addressing toxics-in-fish concerns. This was due in part to the closing of military installations and, in general, the public's increasing concern about contaminants in the environment. MDFW provided technical assistance to the Department of Environmental Protection, the U.S. EPA, the military, and consultants in the form of project proposal reviews and comments relative to critical fisheries habitat, fish sampling and/or remedial strategies involving hazardous waste sites at Fort Devens, Westover Air Force Base, Fort Strong, and Weymouth Depot. MDFW also provided comments to consultants relative to fish sampling protocols at ponds surrounding Otis Air Force base. MDFW assisted other state agencies by collecting fish for contaminant analysis in response to fish contamination concerns at Massapoag Pond in Sharon and Plunkett Reservoir in Hindsdale; provided toxics-in-fish data to consultants, the State Department of Public Health, and the concerned public. MDFW provided comments to the U.S. EPA on the Final Draft Feasibility Study for the Nyanza Site on the Sudbury River.

## **National Pollutant Discharge Elimination System (NPDES) Permit Reviews**

Approximately 30 permits were reviewed; primarily Waste Water Treatment Plants or major industrial discharges to rivers with on-going anadromous fish restoration programs. MDFW continued to provide EPA comments on NPDES Permit renewals relative to the adequacy of discharge limits to protect fisheries resources. This review involved a check to see that discharge limits were calculated correctly, reflected EPA Gold Book Criteria, were appropriate for the fishery in question, and included all potentially toxic components of the effluent. EPA was informed of critical habitats, potential problems with migration of fish, and effects of discharge limitations and water quality sampling protocols on a case by case basis.

## **Construction / Development Impacting Fisheries Resources**

MDFW biologists in cooperation with District personnel conducted site visits, offered technical assistance, served on technical advisory committees, reviewed and commented on project proposals, and represented the Division in meetings with local, state, and federal regulators on a wide range of projects with the goal of minimizing fisheries impacts and incorporating the fisheries concerns of the Division in permits and licensing procedures. Addressed were impacts of hydropower projects on anadromous fish populations; construction and operational impacts of cogeneration facilities on resident fish species as well as review and comment on other projects including Clinton Integrated Solid Waste Dump, Core of Army Engineers North Nashua River Erosion Control Project, Knightsville Dam Stream Alteration Project, DPW's alteration and resurfacing of Route's 70, Route 44, and Route 140, Foundation Park, Shrewsbury, the Hindsdale Landfill Proposal, Taunton River Diversion, Charles River ENRON Project, MDC's Sudbury Aqueduct Project, AMES Norwell Dam Rehabilitation Project, siltation problems at Lake Quinsigamond's tributaries, New Boston Road & Bridge Construction on the Millers River; Lake Buel, Lake George, Ames Pond, Mill Glen Pond and Fawn Lake draw-downs, etc. MDFW also conducted field investigations, reviewed project proposals, offered technical guidance, worked with permitting agencies on a number of water





withdrawal projects; interbasin transfer proposals and gas line crossings of streams statewide. MDFW provided comments on the Army's Tully Lake Drought Contingency Plan, draft DEM Wetland Regulations, Braintree Sunset Lake Weed harvesting Plan, etc.

### **Fish Kill Investigations**

In FY 92 there were 60 freshwater fish kills (51 ponds, 9 streams); 33 (55%) required a field investigation. This compares to 47 fish kills in FY 91. The minimum number of fish killed during the period is estimated at

215,900. Most kills involved less than 500 fish; four kills involved about 2,000 fish each; one kill involved 200,000 alewives as a result of mechanical injury and suffocation due to the lowering of a cranberry bog by pumping. There were 45 natural kills; primarily the result of diseases; most of which occurred in lakes impacted by excess nutrients. Many of these natural kills are repetitive on an annual basis. Pollution-caused kills declined from 14 in FY91 (7493 fish) to 6 (218 fish) in FY92 and were reported to the appropriate state agency for further investigation.

### **Fisheries Staff:**

Mark S. Tisa

*Assistant Director*

Joseph Bergin  
William Easte  
Richard Hartley  
Colleen Hubbard

Richard Keller  
John O'Leary  
Todd Richards  
Ken Simmons

#### **Bitzer Fish Hatchery**

John Williams, *Manager*

Wayne Corey  
Scott Ewell  
Karl Hansen  
Holly Hubert  
Douglas Isles  
John Kopinto

#### **McLaughlin Fish Hatchery**

James Hahn, *Manager*

Robert Chapin  
David Fredenburgh  
Richard Gamelin  
Jennifer Haug  
Alan Jackson  
Annette Kucharczyk  
John Moriarty  
William Mikelk  
Kurt Palmateer  
John Sousa  
Susan Townsend

#### **Sandwich Fish Hatchery**

Alan Aittaniemi, *Manager*

Ernest Green  
Craig Lodowsky

#### **Palmer / Roger Reed Fish Hatchery**

Michael Masley, *Manager*

Arthur Pellegri, Jr.  
Bill Skutnik

#### **Sunderland Fish Hatchery**

Frank Pietryka, *Manager*

John Besse, Jr.  
Les Chadwick  
William Musiak  
Larry Saccawa  
Edward Siwicki  
Jon Sojka

# FISH PRODUCTION FIGURES 1991-1992

	1-4"	6-9"	9+"	12+"	Total # Fish	Weight
<b>McLaughlin</b>						
Rainbow	-	-	8,040	210,076	218,116	169,785
Brook	-	-	91,585	29,635	121,220	74,128
Brown	-	-	3,878	-	3,878	1,462
Totals	-	-	103,503	239,711	343,214	245,375
<b>Montague</b>						
Rainbow	-	-	41,200	29,900	71,100	59,277
Brook	-	7,500	16,000	-	23,500	9,953
Brown	-	22,950	-	21,850	44,800	30,935
Totals	-	30,450	57,200	51,750	139,400	100,165
<b>Sunderland</b>						
Rainbow	-	-	15,480	49,879	65,359	53,727
Brook	-	20,080	27,022	-	47,102	20,488
Brown	-	-	41,516	39,946	81,462	64,694
Totals	-	20,080	84,018	89,825	193,923	138,909
<b>Palmer</b>						
		(Qua)				
Land. Salmon	-	15,425	-	-	15,425	3,085
At. Salmon	-	-	-	210	210	1,680
At. Sal. (fry)	435,800	-	-	-	435,800	130
Tiger Muskies	-	11,000	-	-	11,000	1,375
Totals	435,800	26,425	-	210	462,435	6,270
<b>Sandwich</b>						
Rainbow	-	-	39,000	-	39,000	14,663
Brook	-	14,375	2,500	9,404	26,279	10,245
Brown	-	13,925	2,500	13,474	29,899	14,819
Totals	-	28,300	44,000	22,878	95,178	39,727
<b>GRAND TOTALS</b>						
	435,800 (fry)	105,255	288,721	404,374	1,234,150	530,446
<b>Transfers</b>					474,645	3,745



# Wildlife

Dr. Steven Williams  
*Assistant Director*

The Wildlife Section oversees research and management of all avian and mammalian species which are utilized in any way for sporting purposes. The section has a staff of nine biologists and technicians who conduct projects throughout the state assisted by District personnel and working in close cooperation with the U.S. Fish and Wildlife Service and with the Massachusetts Cooperative Wildlife Research Unit.

## **Migratory Bird Studies**

### **Mourning Dove Census:**

The number of calling doves on eight dove census routes decreased 14% from 1991 to 1992. Among those, the number on three long-term standardized routes increased 7% over the same period.

### **Woodcock Census:**

In the fall of 1991 in the Eastern United States Region, woodcock harvest decreased 11% as measured by the U.S. Fish and Wildlife Service woodcock wing survey. In Massachusetts the woodcock bag increased by 8% according to the same survey.

According to the Annual Woodcock Singing Ground Survey which is conducted in late April and early May, the number of singing males decreased 16.1% in the Eastern U.S. Region, and Massachusetts showed a similar trend, declining 12.1%.

### **Waterfowl Research and Surveys:**

During 1991, the Division began a six year, flyway-wide study of resident Canada geese. The major thrust of the study involves marking geese with flexible, rubber collars coded for individual identification, and then making field observations to determine survival and movements of the marked birds. All collared geese were leg banded and additional geese were leg banded only. Geese were captured by drive trapping during their summer moult when they are flightless. Two catch teams were used to maximize efficiency. This allowed Division personnel to capture geese on 107 sites across the state. A total of 3,091 geese were banded, of which 1,200 were neck collared.

Division personnel also conducted periodic surveys for collared geese during the summer, fall migration, and winter-spring months. A late summer resident Canada goose population estimate of 25-30 thousand geese in Massachusetts was made based on mark-resight data from the August 1 to September 15 observation period. By the end of the third survey period, 65% of the collars put out in Massachusetts during the summer had been reobserved.

The Division banded a total of 891 ducks during spring, summer, and fall trapping operations during 1991. The total included 498 wood ducks, 338 mallards, 15 black ducks, 10 mallard x black duck hybrids, 19 green winged teal, 8 blue winged teal, 1 American widgeon, an unidentified dabbling duck, and 1 hooded merganser. Also banded were 7 soras and a common moorhen. Most of the ducks (853) banded were captured by airboat nightlighting. Twenty-one trips were made during August and September at sites that ranged from the Connecticut Valley to Essex and Bristol Counties. Three nesting wood ducks were banded in Carlisle and additional birds were captured and banded by cooperators bait trapping at the Stony Brook Audubon Nature Center in Norfolk, and the Swift River Wildlife Management area in Belchertown.

During 3-10 September 1991, the Division held its second early Canada goose season in the Berkshire waterfowl hunting zone. The season was designed to increase the harvest of a growing population of resident geese before the fall migration of wild geese from the north began. Complaints about nuisance Canada geese have been increasing in recent years. A late season for geese, similar to that held in the Coastal zone, is not feasible in the Berkshire zone because of winter freeze up. A free permit was required to hunt during the early season and 374 permits were issued, down considerably from the 843 issued last year. Only 212 sportsmen actually hunted during the early season and 107 of them were successful in harvesting one or more geese. A total of 390 geese were bagged during the 7 day season.



The annual Mid-Winter Waterfowl Inventory was conducted on January 7 and 9, 1992. The month of December 1991 was unusually warm with little snow and open water on many inland sites. The only ice on the coast was in high salt marsh. Waterfowl counts fluctuated by species but were slightly higher than last year. The black duck count (23,405) was the highest since 1981. Eider numbers, while lower than last year, were still high with over 100,000 birds seen, primarily in the waters between Nantucket and Martha's Vineyard. Scoter counts were also high (19,625). Mallard, bufflehead, and goldeneye counts were up, while merganser, scaup, and brant counts were low. The Canada goose count of 9,930 was 3% higher than last year, but still 16% below the 10 year average. The MWI counts are conducted the first full week of January by all the states in the Atlantic Flyway. The simultaneous counts limit duplicate counting of late moving waterfowl and, while not a total inventory and influenced by weather on a year to year basis, serve to track population trends for various species over the long term.

The Division conducted its fifth late Canada goose season between January 21 and February 5, 1992. The special 16 day season occurred after the close of the regular goose season, with the goal of harvesting additional resident Canada geese after southward bound Canada geese have migrated through the state. 1992 marked the first year that the season was expanded into the Central waterfowl hunting zone. This increased interest in the season. The Division issued 2,659 permits, up from 1,957 last year. However, only 1,490 hunters actually hunted for geese during the late season. Of these, 642 were successful in bagging one or more birds. The Coastal Zone late season harvest of 1,405 was the lowest in five years, but 1,520 Canada geese were also harvested in the Central Zone.

During April and May of 1992, Division personnel began a survey designed to monitor breeding waterfowl populations in the Atlantic flyway. A total of 75 randomly selected 1 km square plots were surveyed in the three physiographic areas of Massachusetts. States from Vermont and New Hampshire south through Virginia also participated in the survey, which is designed to measure mallard, black duck, wood duck and Canada goose populations. The results

will enable biologists to develop better waterfowl harvest plans tailored specifically to the Atlantic Flyway, instead of relying solely on data from the mid-continent area.

The waterfowl program continued its ongoing wood duck nesting studies during the spring of 1992. There were 435 wood duck and 34 hooded merganser nest starts in 680 boxes checked on 53 sites located across the state. These nest starts resulted in 334 wood duck hatches and 25 merganser hatches for success rates of 76.8% and 73.5%. Total box use by waterfowl was 69%. The number of successful wood duck nests was 8% higher than in 1991 and equalled the record set in 1990, indicating good production at the local level. These results were considered in setting the 1992-93 waterfowl hunting season dates.

### **Pheasant Program:**

A total of 44,093 ring-necked pheasants were distributed statewide in 1991. DFW released 36,730 during the fall hunting season. Sportsmen participating in the Club Program released 7,315 pheasants and 48 pheasants were used in shows and exhibits.

The Ayer State Game Farm produced 29,045 pheasants while an additional 15,000 birds were purchased from contract vendors.

The distribution of pheasants by DFW district personnel was as follows:

S.E. District	7,656
N.E. District	3,886
Central District	15,311
Valley District	12,380
Western District	4,860
<b>Total</b>	<b>44,093</b>

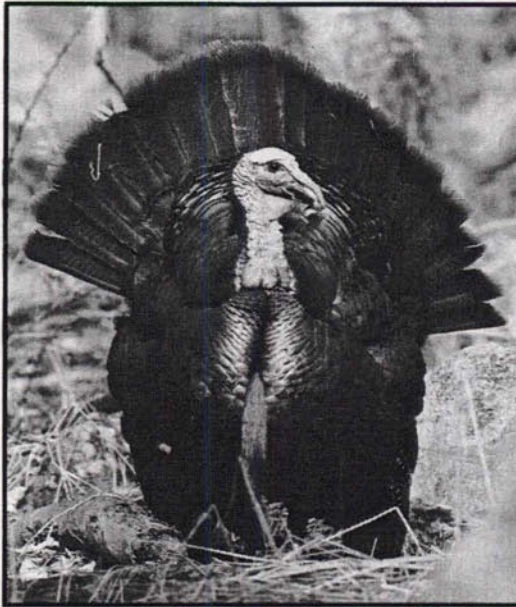
### **Wild Turkey:**

#### **Wild Turkey Range and Harvest Evaluation:**

The 13th Massachusetts spring gobbler hunt was held in May 1992, with the season divided into a one-week first segment and a two-week second segment. The open zone and the number of allocated permits remained unchanged from 1991. A total of 7,661 permit applications were received for the 1st period and 5,530 for the 2nd period. A record harvest of 1010 turkeys was at-



tained, with 735 in the 1st period and 275 in the 2nd period, yielding an overall success rate of 7.6%. The Berkshire county harvest was 404 (40%) with Franklin (221, 22%)



second and Worcester (159, 16%) third. Adult males comprised 504 (50%) of the harvest.

The second modern-day fall either-sex turkey season was held from November 11-16, 1991. The hunting zone remained the same as in 1990. There were 13,856 eligible permittees; however, the actual participation was less. A total of 139 turkeys were taken, including 53 (38%) in Franklin, 50 (36%) in Berkshire, 22 (16%) in Hampshire, and 14 (10%) in Hampden Counties. There were 59 males, 74 females, and 6 unsexed birds taken.

Winter trapping efforts yielded 17 turkeys, of which 14 (2M, 12F) were released at the Hockomock Swamp in West Bridgewater, Plymouth County, and three (3F) released at the capture sites in Berkshire County.

### **Black Bear:**

#### **Black Bear Distribution & Harvest Investigations:**

A total of 1,345 bear hunting permits were issued for the 1991 hunting season. A total of 25 bear were taken during the two-week split season, including 23 in the September segment and two during the November segment. Thirteen males and twelve females were taken in Berkshire (9), Franklin (8), Hampden (4), and Hampshire (4) counties. Four road kills, three "found dead," one depredation kill, and one capture mortality

were also recorded. A total of 27 bear complaints were received, primarily including 7 bears raiding trash and five apiary complaints. The bear hound training restrictions imposed in 1990 were continued.

### **Cottontail Rabbit:**

#### **Cottontail Rabbit Distribution:**

Cottontail specimens were received from cooperating hunters, wildlife rehabilitators, road kills, and miscellaneous sources in order to ascertain the distribution of the two cottontail species in Massachusetts. A total of 491 specimens were received, including 467 (95%) Eastern cottontails from 13 of 14 counties and 24 (5%) New England cottontails from four of 14 counties. This study will continue during 1992-93.

### **Furbearer Program:**

The furbearer program is responsible for the management and research of twelve species of wildlife in the Commonwealth. This group includes weasel, skunk, fox, coyote, beaver, otter, fisher, raccoon, opossum, bobcat, muskrat and mink.

Massachusetts' furbearers are abundant and widely distributed throughout the state. The value of the Commonwealth's furbearer resource is very diverse and includes ecological, recreational, economic, educational and aesthetic opportunities.

The furbearer management program uses many wildlife management techniques including habitat manipulation and regulated hunting and trapping as management tools. The combination of these two techniques in particular are used to:

1. Control problem animals
2. Control wildlife populations
3. Reduce habitat degradation
4. Reduce crop and property damage
5. Reduce competition within animal populations

In addition, these activities provide recreational and economic opportunity for citizens and households in the state. In the past fiscal year citizens spent over 7,000 days afield harvesting and viewing furbearers and spent over \$69,618 while conducting harvest activities. A total of 17,874 furbearers were harvested in the 1991-92 season. Harvest by species was 1,223 beaver, 29 bobcat, 102 coyote, 85 fisher, 128



otter, 131 red fox, 38 gray fox, 2,807 raccoon, 631 mink, 60 skunk, 174 opossum, 7 weasel and 12,519 muskrat. Private trappers who trap for recreation, food, and financial gain conduct population reduction of wildlife at no cost to the general public. Residents of the state thereby derive financial savings due to decreased property damage caused by furbearers, as well as decreased need for paid animal control agents.

Massachusetts has complex and restrictive laws and regulations that affect trapping. These include:

1. Mandatory licensing of trappers
2. Mandatory trapper training
3. Restrictions on the size of traps
4. Restrictions on types of traps
5. Restricted seasons for trapping
6. Restricted areas for trapping
7. Mandatory regular checking of traps
8. Mandatory tagging of traps with the name and address of the trapper.

During this past year, two new regulations were established involving the harvest of furbearers. These regulations were:

- 1) establishment of the mandatory sealing of wild mink pelts,
- 2) discontinuation of the requirement that entire carcasses of eastern coyote be turned in for biological analysis and requirement the skulls only be submitted.

#### **Public Education:**

Public education is a large part of the furbearer management program. In the past year furbearer project personnel gave 22 presentations to the public. Included were five presentations on rabies to 425 people, six presentations on Eastern coyote to 590 individuals, four presentations on beaver to 315 individuals and seven presentations on general furbearer programs to 300 people. In addition, posters and handouts on relocating wildlife, rabies, trapping and furbearer management, and beaver management were prepared. Slide shows were developed on beaver management, coyote management, and proper fur handling.

#### **Management and Research efforts:**

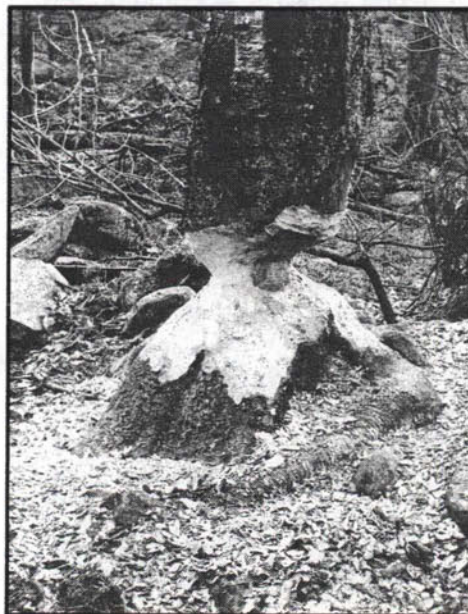
**Pelt sealing:** Pelt sealing is used to gain harvest information and information about distribution of beaver, otter, red fox, gray fox, bobcat, coyote, mink and fisher statewide. In addition, biological information is gathered from selected species on the sex, age, and reproductive status of the animal. During the 1991-92 harvest season, the Division pelt-sealed 2,367 animals. Fur harvesters are required by law to turn over specimens of particular harvested species, which are then examined for sex, age and reproductive status. The Division collected and processed 344 specimens for laboratory examination during the 1991-92 year.

#### **Furbuyer reports:**

Individuals receiving the pelts of wild animals must be licensed by the Division. These furbuyers are required to report the numbers and species of pelts they receive through purchase, bartering or gifts each year. License fees are \$25.00 per year for residents and \$75.00 per year for non-resident furbuyers. In 1991-92, 25 licensed furbuyers submitted annual reports for 13 species of animals representing a total of 9,499 pelts. These pelts are typically used in the making of garments and other consumer products. The Massachusetts fur harvest contributes between one-half to two million dollars per year to households in the state and contributes to the eight billion dollar fur industry nationwide.

#### **Wetland/beaver management:**

Beaver occupy all suitable habitat in Massachusetts. The Division receives 190-210





complaints about beaver activities each year. The number of complaints about beaver causing property damage has increased steadily over the past five years. The Division investigates all beaver complaints it receives. Technical advice is given and sometimes flow devices are installed by Division personnel to create and maintain wetlands and alleviate property damage.

The Division has developed brochures that explain options to landowners, discussing the positive and negative aspects of beaver activities, associated wetlands values and overall management of beaver. Public education, regulated harvest, and the installation of flow devices are major components of this program. Division management goals for beaver include utilizing beaver for their wetland values, regulating beaver populations within available habitat, and minimizing economic damage to public and private property by beaver.

#### **Wildlife depredation and damage:**

Division personnel responded to several dozen complaints of depredation on domestic livestock and pets by eastern coyotes, red foxes and gray foxes. Site visits and technical advice were conducted in efforts to eliminate or alleviate damage situations. New brochures were developed to help inform the public about wildlife and depredation problems. Complaints regarding eastern coyotes, particularly from the southeastern and Cape Cod sections of the state, continue to increase. Complaints range from coyotes killing livestock, poultry, domestic house cats and dogs to coyotes on airport runways jeopardizing the arrival and departure of aircraft.

#### **Disease program:**

Furbearer program personnel have been monitoring an outbreak of rabies in raccoon populations along the eastern seaboard since 1977. This epizootic has been spreading northward and is currently in the neighboring states of New York and Connecticut. In anticipation of this disease spreading into Massachusetts, the Division prepared a rabies action plan which outlines various courses of action for dealing with this epizootic both administratively and regulatorily. This epizootic will greatly affect raccoon populations in the Commonwealth which at this time are estimated at 200,000-265,000. The majority of the raccoon population oc-

curs in areas of high human population densities. The potential for interactions between raccoons and humans or domestic animals is very high.

#### **White-tailed Deer:**

Division biologists were involved in research, management and educational activities that reached many citizens of the Commonwealth and led to better understanding and control of the state's estimated 60,000 white-tailed deer.

The major research effort was analyzing herd growth and population characteristics across the state. During the 1992 deer hunting seasons approximately 80,000 hunters harvested 9,316 deer. Division staff collected biological data on 38% of these deer. Yearling male antler beam diameters and deer weights indicate that the increasing herd size has not affected the good physical condition of deer or their range.

A special deer hunt was conducted at the Quabbin Reservation during 1992. This special, highly controlled, management-oriented hunt was developed jointly by the Division and the Metropolitan District Commission in an effort to reduce an extremely high population of deer that had been negatively impacting ecosystem health at Quabbin for years. In this effort, an additional 724 deer were harvested, nearly 100% of which were examined for biological data by the Division.

Deer management goals have been established for each of the 14 deer management zones and for Quabbin Reservation. These goals were developed in order to control deer populations at levels (1) compatible with humans and human land use practices, and (2) compatible with the natural ecosystem's capabilities to support deer.

The basis of deer management in Massachusetts is control of the female deer harvest during the shotgun deer season through the antlerless deer permit system. Nearly 41,000 sportsmen applied for antlerless permits during 1992 and the Division issued over 16,000 of them. The \$5.00 permit fee generated over \$80,000 toward costs associated with managing wildlife resources. Archers and primitive firearms hunters contributed in excess of \$135,000 to Division programs via purchases of a stamp that allows them to hunt deer during these spe-



cial seasons. In addition, deer hunters in Massachusetts contributed approximately \$35 million to the state's economy through purchases associated with hunting (i.e., hunting equipment, transportation, food and lodging).

### **Falconry Program:**

During FY92, 14 apprentice, 14 general and 8 master falconry permits were issued. In addition, 10 raptor propagation and 14 raptor salvage permits were issued.

### **Forestry:**

Progress was made on each of the forestry program's three objectives, which are:

- 1) Build a forest inventory data base, prepare a forest cover type map, and establish property boundary lines in the field for each wildlife management area (WMA).
- 2) Use inventory data to design and carry out both commercial forest cutting operations and non-commercial management activities that improve wildlife habitat on, and human access, into each WMA.
- 3) Determine the response of wildlife populations to forest cutting operations.

### **Forest Inventory Data Base**

The forestry program continues to benefit from interaction with the Massachusetts Cooperative Wildlife Research Unit and the University of Massachusetts Department of Forestry and Wildlife. Two undergraduate students were hired from the Department through the Unit, and conducted forest inventory on a total of 800 acres, including 500 acres on Fox Den WMA in Worthington during July and August, 1991, and 300 acres on the Phillipston WMA in Petersham and Phillipston in June, 1992.

Computerized mapping on the ARC/INFO geographic information system (GIS) began in FY 91 when the Clemmer/Northwood parcels (1,000 acres) of the Hy Fox WMA in Chester were digitized. GIS work continued in FY 92 with the completion of digitizing for the BSA/Fox parcels (1,200 acres) of the Fox Den WMA in Worthington and the Freedman parcel (270 acres) of the Hy Fox WMA in Worthington. In addition, an updated map of the Clemmer/Northwood parcels of the Hy Fox WMA was produced. The new map incorporates all of the forest cut-

ting activities that occurred on this WMA from 1986-1990. Base maps for the High Ridge WMA and for the LeBreque/Powell parcels of the Fox Den WMA were compiled and are ready to be digitized.

A total of 3.9 miles (20,727') of WMA boundary lines were established, all on the LeBreque/Powell parcels of the Fox Den WMA; 15,824' was woodland boundary, 533' was road frontage, and 4,370' was river frontage.

### **Forest Cutting Operations & Management Activities**

A contract for the commercial sale of 92,000 board feet of white pine timber and 15 cords of firewood on the McLaughlin Fish Hatchery grounds was completed in February, 1992. This operation was conducted by LeClerc & Son Logging of Belchertown after a public, competitive bid. The operation was valued at \$7,240, and included construction of 1,000' of paved access road on the hatchery grounds.

A second contract for the commercial sale of an additional 35,000 board feet of white pine timber on the McLaughlin Fish Hatchery grounds was awarded to LeClerc & Son Logging of Belchertown in February, 1992 to finish paving of an access road begun during the first operation. The second contract was valued at \$2,700 and included paving of 100' of access road, removal of non-commercial trees from around buildings on the hatchery grounds, and delivery of lumber and other building materials for construction work on the hatchery grounds. Work on this second contract was completed in April, 1992.

A contract for the commercial sale of 45,000 board feet of spruce timber, 60 cords of spruce pulpwood, and 10 cords of firewood on the Peru WMA was completed in September, 1991 by Independent Log & Timber of Williamstown. This operation was valued at \$3,200 and included a gas-powered electric generator supplied to the Western District office in Pittsfield.

Non-commercial management work included prescribed burning on the Hiram Fox WMA in Chester, and site preparation for white pine regeneration on a portion of the Hiram Fox WMA in Chesterfield. The prescribed burning included a quarter acre seeded landing and a 1 1/2 acre clearcut that was established in 1988. The objective of the burn in the seeded landing was to



rejuvenate herbaceous vegetation and retard invasion by woody tree and shrub species. The primary objective of the burn in the 1 1/2 acre clearcut was to set back growth of hardwood coppice and enhance the establishment of native shrub and herbaceous species. A secondary objective was to maintain an open condition to allow wildlife observation on these 1 1/2 acres which are adjacent to the main access road into the WMA.

The seeded landing was burned in April, 1992, and the clearcut was burned in May, 1992. The clearcut burn achieved about an 85% kill of hardwood coppice. Existing saw-timber size red oak trees which had been retained when the clearcut occurred were protected from the fire by raking slash away from the base of the trees during the week before the burn, and by wetting the tree trunks and ground at the root collar immediately prior to conducting the burn.

Site preparation on the Hy Fox WMA involved cutting and herbicide stump treatment of poor quality American beech saplings (1-3" dbh) growing in the understory of a mature forest stand of good quality white pine. The site preparation occurred over an area of about five acres and was designed to increase the likelihood of establishing good regeneration of white pine when the overstory is partly removed during a planned shelterwood cut. Without the site preparation work, the shade created by the beech saplings would likely prevent the desired regeneration of white pine.

#### **Response of Wildlife Populations to Forest Cutting**

A 600 acre area of the Hy Fox WMA in Chester was checked for ruffed grouse, wild turkey and woodcock in April, 1992, and a further census was conducted for breeding songbirds on a 1,000 acre area in June, 1992. A total of 4 drumming ruffed grouse were recorded for an average density of <1.0 drumming male/100 acres. In 1992, 2 singing male woodcock were recorded, compared with 3 in 1991, 4 in 1990, and 0 in 1986-89. Only one gobbling male wild turkey was recorded in 1992, compared with 1 in 1991, 6 in 1990, 2 in 1989, 1 in 1988, and 0 in 1986-87. While increased hunting pressure on the WMA during the spring season may be partly responsible for the decline from 1990 to 1991 and 1992, the decline is more likely a chance aberration in the sampling, since turkey

sign (tracks and droppings) are still common on the WMA. The line transect sampling used is designed to tally drumming ruffed grouse and may be too disruptive to accurately census wild turkey.

The 1,000 acre songbird census has been conducted bi-annually since 1986. Results of the census indicate that the diversity of bird life on the WMA has increased, primarily as a result of forest cutting operations which included the establishment of small clustered clearcuts. Ten small clearcuts totalling 37 acres were established from 1987 to 1990. An additional 156 acres has undergone partial cutting under a shelterwood system. Altogether, cutting has occurred on a total of 193 acres, or about 19% of this 1,000 acre area. It is important to note that all bird species which occurred on the WMA prior to cutting still occur at comparable densities after cutting.

The 1,000 acre census was conducted in 1986, 1988, 1990, and 1992, and yielded a total of 62, 67, 72 and 71 bird species, respectively. Among the four census years, a total of 88 species have been recorded. Of these, 32 species were recorded at trace levels (not recorded in some years, and when recorded only one or two individual birds were observed on the entire 1,000 acre area). Examples of such species include the ruby-throated hummingbird, alder flycatcher, blue-gray gnatcatcher and pine siskin.

An additional five species were recorded at fluctuating levels and were absent in one or more years. These included the mourning warbler and swamp sparrow, which were not recorded in 1986, but later were recorded at >10 at stations in clearcut areas. Also included here are three species whose fluctuations did not appear to be related to the local forest condition. White-throated sparrows had increased noticeably in clearcut areas in 1990, but were only a trace occurrence in 1992. The tufted titmouse was recorded at trace levels in 1986-1990, but increased noticeably in 1992. Finally, the Swainson's thrush disappeared from the census in 1990 and 1992 after being recorded at moderate levels in 1986 and 1988.

The remaining 51 species were recorded in all censuses. Of these 51 species, one (the brown creeper) decreased in each of the four census years, 35 species remained



unchanged, and 13 species appeared to increase. Species which appeared to increase included five birds which would be expected to use clearcut areas to varying degrees, such as the gray catbird, chestnut-sided warbler, magnolia warbler, common yellowthroat, and Canada warbler. However, eight other species more commonly associated with mature forest have also appeared to increase. These include the yellow-bellied sapsucker, downy woodpecker, pileated woodpecker, red-breasted nuthatch, wood thrush, solitary vireo, black-throated blue warbler, and rose-breasted grosbeak.

#### **Future Work**

Work planned for fiscal year 1993 includes completing forest inventory and boundary work on the Phillipston WMA in Petersham, Barre and Phillipston. A commercial timber sale is planned for the original portion of the Fox Den WMA.

#### **Massachusetts Cooperative Wildlife Research Unit Fisher Ecology Research: Eric York**

The Division continued a research study investigating population dynamics, survival, and identify causes of mortality of fisher (*Martes pennata*) in central Massachusetts. Information gained from this project will be incorporated into current fisher management programs and will aid in refining area-specific trends in fisher biology.

#### **Movements & Mortality of White-tailed Deer Fawns: Tom Decker**

Field studies and data collection have been completed. The final analysis of data is being conducted and the final report is in preparation.

#### **Response of Black Bears to Habitat and Land Use Changes in Massachusetts: David Fuller**

Capture, monitoring, and den checks of radio-collared black bears were continued in the Conway-Williamsburg study area. This area has a higher proportion of urban development and agricultural land than most of the black bear range in western Massachusetts. To obtain a better estimate of the bear population, a second study area was established in the Savoy-Hawley area and intensive capture efforts began there in the summer of 1989. A total of 22 new captures and nine recaptures were made in Savoy-

Hawley and 12 new captures and four recaptures in Conway-Williamsburg. Forty-four bears were being radio-monitored as of 6-30-90, including 21 in Savoy-Hawley and 23 in Conway-Williamsburg.

Sixteen newborn cubs from eight litters were observed during February and March of 1990. Average litter size was 2.0. A record number (10) of marked bears were killed in 1989-90, including five males and five females. This increase relates to (1) cessation of a request to refrain from shooting collared bears; (2) changes in collar color, which makes that marker less visible; (3) an increase in marked bears in the population; (4) an increase in bear hunters; and (5) good hunting conditions in 1989.

Bear location data were input to the GIS system program ARC/INFO at the University of Massachusetts from computer files supplied by former graduate student Kenneth Elowe. These data were combined with Massachusetts habitat data from the Mass.GIS. A complete array of all bear location data is presently being compiled and will be transferred to ARC/INFO when available and edited.

#### **Furbearer Population Models in Wildlife Management: Tom Mahaney**

Nine models were identified from the literature which dealt specifically with the five furbearers of particular interest to the Division. Two were concerned with bobcat, five with coyote, one with beaver, and one with fisher. A tenth model was more generalized and could be applied to all five species.

Questionnaires were mailed to 91 wildlife agencies, of which 65 (71%) have been returned. Twenty-three of the 65 respondents indicated that they used, knew of, or were developing furbearer population models. Of the 28 models used by these respondents, 27 were computer-based or mathematical and one was a conceptual model. The next step will be to review and test the applicability of the various models to furbearer management in Massachusetts.

#### **Movements, Habitat Selection, and Population Characteristics of River Otters in Massachusetts: Douglas Newman**

The final report was completed. Freshwater habitats used by river otters included three wetlands systems (palustrine, lacustrine, and riverine) with 11 subdivisions

within these systems. Preferred sites for otter latrines (indicative of habitat use) included small peninsulas, isthmuses, mouths of permanent streams, and sites with large conifers and beaver bank dens and lodges. Habitat management strategies should en-

courage beaver populations and to consider availability of mature conifers along wetland shorelines.

### **Wildlife Staff:**

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### **Game Farm Staff Ayer Game Farm**

Stephen Foster, *Manager*  
Robert Bennett  
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Walter Godinho  
John Sheedy



# Natural Heritage & Endangered Species Program

Dr. Thomas W. French  
*Assistant Director*

## Legislation & Regulations

The recently enacted Massachusetts Endangered Species Act, Chapter 131A in Massachusetts General Laws, stipulated that regulations be adopted by the end of calendar year 1991 and that a nine member technical advisory group be convened to advise the Division in the preparation of these regulations. The committee, which was established in March 1991, finished its work in July with discussion of a full draft of the complete regulations. Two public hearings were held concerning the proposed regulations in Woods Hole and in Holyoke during September. The agency received over thirty written comments on the public review draft of the regulations and numerous improvements to the draft were incorporated into the final regulations. The Fisheries & Wildlife Board voted to adopt the regulations on December 30th. The complete regulations covering 40 pages were published as part of the Code of Massachusetts Regulations on January 31, 1992 and became effective on that date. Part of the promulgation process included placing the previous regulatory list of Endangered, Threatened, and Special Concern Species with a few changes into the new regulations and deleting the old list (321 CMR 8.00).

## Rare Species List Changes

Twenty changes to the regulatory list (321 CMR 10.60) of Endangered, Threatened, and Special Concern Species were made during this fiscal year. The changes consisted of: the addition of two reptile species (the Black Rat Snake and the Worm Snake) and 13 plant species, the deletion of four plant species, and the change in listing status of one species of invertebrate animal.

## Data Management

To produce the new 1992 Atlas of Estimated Habitats for Rare Wetlands Wildlife, the Program used the state's Geographic Information System (GIS) to print reduced size quadrangle maps for all new (3) or revised (72) quadrangle maps. In addition, a total of 102 new Estimated Habitat town maps were all prepared for the first time

using the GIS. These were sent to individual towns. Certified Vernal Pools were indicated for the first time in both the atlas quadrangle maps and on the town maps. County Estimated Habitat maps for state-listed rare wetland invertebrate animals were also produced and distributed to seven eastern Massachusetts Mosquito Control Boards.

During this fiscal year, the Program worked on creating a point coverage layer of rare species occurrences in the GIS, creating a "priority habitats" data layer in the GIS, and computerizing Vertebrate Characterization Abstracts. Point coverage data was provided to the U.S. Fish & Wildlife Service as part of the congressionally authorized study within the Connecticut River watershed for a potential Silvio Conte National Wildlife Refuge.

## Environmental Review

Under the Program's responsibilities in the state Wetlands Protection Act regulations, 477 projects ("Appendix A forms") were reviewed for their potential impacts on habitat for rare wetlands wildlife. In addition, reviews were conducted on a number of forest cutting plans and mosquito control projects. During the year 123 vernal pools were certified, bringing the total number of certifications to approximately 280 in over 60 towns.

Potential threats to rare species and exemplary natural communities posed by other projects were reviewed through various federal, state and local environmental review processes. These reviews resulted in 356 written comments. Some notable projects commented upon were a pier proposed for Clark's Island and a landscaping project near a Britton's Violet population in Concord. Comments were also provided on the proposed changes to the Federal Wetlands Delineation Manual and discussions were held with the Department of Environmental Management on the implementation of the state Water Management Act on Cape Cod.

## Land Protection

This fiscal year saw the acquisition by the Division of Fisheries & Wildlife of nine par-



cels of particular interest to the Natural Heritage & Endangered Species Program. Using open space bond funds available for wildlife habitat acquisition, 437 acres were purchased, mostly in the western part of the state.

Town	Acres	Natural Community Type Protected
Stockbridge	72	calcareous basin fen
Hinsdale	11	calcareous seepage swamp
W. Stockbridge	118	rich mesic hardwood forest
Leverett	11	rich mesic hardwood forest
Sunderland	15	riverine cobble islands
Westfield	192	amphibian breeding wetlands (2 parcels)
Plymouth	17	coastal plain pond
Edgartown	1	sandplain grassland (inholding)
<b>Total</b>	<b>437 acres</b>	

On January 31, 1992, a 14,500 acre area was designated as the Hinsdale Flats Watershed Area of Critical Environmental Concern. This area encompasses one of the acquisitions listed above.

### Program Promotion, Information & Education Newsletter & Handouts:

The Program produced the second and third issues of "Natural Heritage News," which expanded to eight pages as well as two-color printing. Several thousand copies of each newsletter were distributed.

### Fund Promotion:

Activities to promote contributions to the Natural Heritage & Endangered Species Fund included the following:

1. 200 posters featuring original color illustrations of rare species were placed in Boston subways;
2. an advertisement in CPA Review magazine appeared on the inside front cover of the winter edition that featured original color illustrations of rare species;
3. a similar advertisement was placed in *Massachusetts Wildlife* magazine;
4. small advertisements ("Save Something...") appeared in the February and March issues of the CPA Society's monthly newsletter that was circulated to 7500 cer-

tified public accountants;

5. the television public service announcement with Tip O'Neil, Curt Gowdy, and Kevin McHale, prepared previously, was redistributed to 22 stations;

6. print public service advertisements ("Save Something ...") of various sizes were distributed to newspapers state wide;

7. the Massachusetts Field Office of The Nature Conservancy collaborated on a post card that was mailed to their 17,000 members in Massachusetts;

8. a photo opportunity of Governor Weld appearing with a live Bald Eagle in the State House resulted in prominent coverage in the *Boston Globe* and *Boston Herald*.

### Conferences:

Over 30 presentations were given during the year sponsored by a variety of groups including the following: Allen Bird Club, Attleboro Ten Mile River Watershed Alliance, Massachusetts Association of Conservation Commissions, Massachusetts Audubon Society, Massachusetts Barrier Beach Symposium, a seminar on the New Massachusetts Endangered Species Act sponsored by Massachusetts Continuing Legal Education, Massachusetts Department of Environmental Protection, Massachusetts Mosquito Control Boards, New England Wildlife Center, Northeast Technical Committee meeting of the Wildlife Society, Society of American Foresters, the University of Massachusetts, and the Timber Rattlesnake Symposium.

### Published Papers:

Articles published by Program staff in 1991 include:

Melvin, S.M., C.R. Griffin, & L.H. MacIvor. 1991. Recovery strategies for piping plover in managed coastal landscapes. *Coastal Management* 19:21-34.

Swain, P. 1991. Prescribed burning in Massachusetts. *Massachusetts Wildlife* 41:10-19.

### Personnel

There were several changes in program staffing during this year. Program botanist Bruce Sorrie resigned to pursue botanical inventory work in North Carolina while the



Program's Wetlands Wildlife Biologist, Dr. Steven Roble, left the Program for a zoological position with the Virginia Natural Heritage Program. Dr. Paul Somers joined the Division as the Program's new Botanist. He came to the Program with 15 years of botanical experience with the Tennessee Natural Heritage Program.

## Budget

The money for 84% of the Program's annual operating budget continues to come from voluntary contributions on state income tax forms that are deposited in the Natural Heritage & Endangered Species Fund. Contributions for calendar year 1990 declined 14% from the previous year.

Tax Year	Amount	# Contributors
1990 final tab. (12/27/91)	\$347,547	72,599
1991 incomplete (7/3/92)	\$234,532	

The new contribution line for AIDS on state income tax forms received a larger total in donations on 1990 tax returns than did the Natural Heritage & Endangered Species Fund. This is the first time that another income tax form contribution line has received more than the endangered wildlife conservation line.

The Program's appropriations and expenditures were as follows:

Line Item	Appropriated	Expended
Nongame Mgt. acct.	\$377,054 100% NHESF	\$354,411
Nat'l Heritage acct.	\$179,320 50% NHESF 50% Int. Fish & Game Fund	\$162,580
<b>TOTALS</b>	<b>\$556,374</b>	<b>\$516,992</b>

Due to a new state law (MGL c29, s5d), the indirect cost ("fringe benefits") of state personnel is now charged directly to each dedicated fund from which the salary was drawn. This results in a major new expense for the Program.

The Program was able to augment its financial resources by obtaining: "Section 6" reimbursement from the US Fish & Wildlife Service for approved projects concerning certain federally listed endangered and threatened species (\$29,500); and, thanks to cooperative agreements with The Nature Conservancy, a grant from the US Fish &

Wildlife Service for wetland birds research (\$27,000); and money from the Massachusetts Field Office of The Nature Conservancy for Connecticut River Valley biological inventories (\$25,000).

## Inventory, Research & Species Management

### Small Research Contracts Program

In January, 49 proposals were received requesting a total of \$97,793 for 1992 inventory and research projects. Of these, 34 projects were funded and will be listed in the 1993 annual report. In 1991, the Program funded 31 research and inventory projects for a total of \$48,372, with \$25,000 of this funding having been supplied to the Program by the Massachusetts Field Office of The Nature Conservancy.

### Small Research Contracts funded in 1991

#### Invertebrate Wildlife

- R. Charlton: Dragonfly inventory of the Connecticut River
  - E. Colburn: Extensive checklist of aquatic insects
  - R. Edwards: Spider diversity on Cape Cod
  - P. Goldstein: *Lepidoptera* and ant inventories
  - C. Knisley & J. Hill: Beach Tiger Beetle reintroduction trial
  - M. Mello: *Lepidoptera* survey of Myles Standish forest
  - M. Mello: *Lepidoptera* survey of valley pine barrens
  - P. Nothnagle: Puritan Tiger Beetle monitoring
  - P. Nothnagle: Northeastern Beach Tiger Beetle monitoring
  - D. Savignano: Habitat assessment for Karner Blue butterfly
  - D. Swanson: Dragonfly survey of Martha's Vineyard
- #### Vertebrate Wildlife
- J. Fosberg: Blanding's Turtle in southern Worcester Co.
  - H. Gruner & M. Klemens: Herpetological survey of Holyoke range



- J. Hatch: Piping Plovers and terns in Buzzard's Bay
- S. Hecker: Piping Plover monitoring on Cape Cod, etc.
- S. Jackson et al: Herpetological survey of Mount Toby
- I. Nisbet: Demographic studies of Roseate Terns
- V. Rough: Grey Seal aerial survey
- M. Silver: Management of Cliff Swallow colonies
- E. Strauss: Piping Plover monitoring
- H. Whidden & D. Klingener: Southern Bog Lemming survey

#### Plants

- R. McMaster: Adder's-tongue Fern survey
- T. Smith: Rare plants of beaches and dunes of Essex Co.
- L. Standley: Systematics of a spike-sedge complex
- P. Weatherbee: Survey for two Berkshire County rare plants
- S. Zielinski: Population study of Britton's Violet

#### Natural Communities

- P. Dunwiddie: Old growth forest survey
- C. Johnson & K. Searcy: Connecticut R. valley habitat indicator plants
- G. Motzkin & W. Patterson: Calcareous fen characterization
- G. Motzkin & W. Patterson: Connecticut R. valley community inventory
- E. Thompson: Deerfield River valley community inventory

#### FIELD

#### SEASON ACCOUNTS

##### Birds, 1991

**Piping Plover:** A total of 160 breeding pairs of Piping Plovers were tallied at 55 sites in Massachusetts in 1991. This is the largest breeding population recorded in Massachusetts since statewide surveys began in 1985. Overall mean productivity was 1.72 chicks fledged per pair, based on estimates of fledging success for 156 of 160 (98%)

pairs. This is the highest and most complete estimate of productivity recorded in Massachusetts to date. The increases in abundance and productivity observed in 1991 are attributed to intensive management to minimize impacts of predation, habitat alteration, and disturbance or direct mortality resulting from human recreational activities. Monitoring and management activities are carried out by a statewide network of biologists and land managers, coordinated by the Massachusetts Division of Fisheries & Wildlife.

**Terns:** Results of the 1991 tern census were, overall, not encouraging. Roseate Tern numbers did rise 12% to 1,776 pairs from 1,585 pairs a year earlier, but this only placed the population squarely in the middle of the range over which it has fluctuated for nearly two decades. Nesting stations utilized slid from six to five, with one of the sites being very marginal. Bird Island in Marion continues to harbor 97% of the Massachusetts pairs. The Massachusetts total accounts for approximately 50% of the estimated population in the northeastern United States. All other species of terns declined. Common Terns, after barely marking a sixth consecutive year of increase in 1990, reversed the trend in 1991, declining 4% from earlier levels to an estimated 9,835 pairs. The number of nesting stations was 32, the same as 1990. Productivity at Nauset-New Island, the largest nesting group of Common Terns, was adversely affected by Great Horned Owls, which raided the colony throughout much of the nesting season. Arctic Terns slid an alarming 48% from 21 pairs in 1990 to only 11 pairs in 1991, the lowest estimate since records have been kept. Pairs were reported from only three sites, versus five in 1990. Most of the historic nesting stations available to the Arctic Tern in Massachusetts remain available and are protected. Least Terns were off 8% from 1990 with an estimated 2,356 pairs at 46 sites compared to 2,546 pairs at 43 sites a year earlier. Least Terns, being the most adaptable to mainland-attached sites, continue to prospect at new sites. This year, nesting Least Terns appeared for the first time on a small sandbar at the eastern end of Logan Airport. For the first time ever, a pair of Forster's Terns nested in the state. They were discovered among the small salt marsh-nesting group of Common Terns in the Parker River marshes.



Five pairs of Black Skimmers, all at Nauset-New Island, nested in the state in 1991, a record high number.

**Ram Island Project:** From April 16 through June 20, 1991, field operations for the restoration of nesting terns were carried out at Ram Island in Buzzards Bay, Mattapoisett. Gull production was ended through two treatments of gull toxicant and breaking of gull eggs. Operations also expanded in 1991 to suppress Double-crested Cormorant production, through breaking of eggs and human presence on the island. Mechanical exclusion techniques were attempted and proved to be ineffective. A gull enclosure set up over prime tern nesting substrate did not work and a 4-foot fence intended to discourage take-offs and landings of cormorants was also unsuccessful. Tern decoys were set out inside and around the gull enclosure, attracting Common Terns which, however, did not nest due to persistent territorial gulls. After two field seasons of reclamation work, the nesting gull population on Ram Island has been reduced at least 80 percent, and the cormorant nesting group has been arrested and possibly reversed.

**Wetland Birds Research:** In 1991, staff began a new cooperative study of wetland bird populations and habitat through the Department of Forestry and Wildlife Management at the University of Massachusetts-Amherst. During the next two years, graduate student Shawn Crowley will use playback vocalizations to survey abundance and distribution, and examine habitat relationships of grebes, bitterns, rails, and other species of freshwater wetland birds in Massachusetts.

**Partners in Flight:** In 1990, the "Partners in Flight" program (The Neotropical Migratory Bird Conservation Program) was launched by the National Fish and Wildlife Foundation to study issues related to neotropical bird populations, confirmed in long-term population trend data published by the USFWS in 1989 to be declining. This is a domestic and international initiative spanning the Americas, perhaps geographically one of the largest ever established to look at any wildlife issue. Habitat loss and fragmentation are believed to be key issues. Anticipating the need for solid population data on neotropical bird species breeding in Massachusetts, the Natural Heritage

& Endangered Species Program initiated its own point count survey at the Hiram Fox Wildlife Management Area in 1986. Over 330 sampling stations have been established along over 14 miles of transects up and down ridges of the area. During early June 1991, 100 stations were sampled, recording 1,163 individuals of 58 species. The five most frequently recorded were Ovenbird (194), Red-eyed Vireo (158), Veery (67), Redstart (62) and Black-throated Green Warbler (56).

**Bald Eagle:** Five territorial pairs of Bald Eagles were found in Massachusetts in 1991. Four of these were on Quabbin Reservoir and one was at Barton Cove on the Connecticut River. One of the pairs at Quabbin was new since the previous year. Of these five pair, one failed to breed following the collapse of its nest over the winter, one lost its single chick to bad weather just after hatching, one lost its single chick at five weeks of age to raccoon predation, and two pairs fledged two chicks each. Following the release of 41 young eagles through a "hacking" program between 1982 and 1988, a total of 11 chicks have fledged from wild Massachusetts nests as follows: 1989 (3), 1990 (4) and 1991 (4). In the January, 1992 survey, 56 bald eagles and one golden eagle were counted.

**Peregrine Falcon:** Two pairs of Peregrine Falcons returned to their traditional sites in Boston and Springfield. They laid a total of seven eggs, hatched five and fledged all five. Unfortunately, post-fledging mortality was high. One Boston bird was killed by striking a skyscraper window on the day it fledged, one Springfield bird met the same fate two days after fledging, and a second Boston bird was hit and killed by an airplane at Logan International Airport after it had been on the wing for about a month.

There were several additional unpaired subadults (i.e. second year birds) in Massachusetts during the spring and summer. These included a male which took up residence on the Commonwealth Electric power plant in New Bedford, and a female at Bird Island which was apparently attracted by the good hunting. Bird Island is the largest colony of the endangered Roseate Tern in North America. Over a period of about three weeks the falcon not only killed a substantial number of adult Roseate and Common Terns, but also disrupted the breeding activities of the entire colony. Considering the



great importance of this tern colony and the transient state of this Peregrine's age, the Division decided to have the falcon trapped and released on the coast north of Boston. Other subadults included an unbanded male at Logan airport on May 16th and a female trapped and banded by Norm Smith at Logan on June 3rd.

**Osprey:** The figures for the 1991 osprey nesting season were as follows (changes noted are in comparison to 1990 data):

Occupied Nests	Active Nests	Successful Nests	Percent Success	Young Fledged
242 (+42)	205 (+31)	169* (+33)	82* (44%)	327* (+55)

\* Estimated number using average success and productivity rates for Martha's Vineyard. Data on these figures were not collected on Martha's Vineyard.

The 1991 season marks the 11th consecutive year that the number of occupied osprey nests in Massachusetts has increased. The Westport River "colony" increased by 17 pairs, and an increase of 11 pairs was reported for Martha's Vineyard. Ospreys made a significant jump inland to nest in the town of Norfolk. A pair in Ipswich failed in 1991, but possible additional pairs on the north shore are expected in 1992.

**Common Loon:** The number of territorial pairs of loons was 10, up from 9 in 1990 and equal to the record set in 1987. Seven of the 10 pairs were on Quabbin Reservoir, and single pairs were found at three additional lakes. Eight chicks hatched (up from seven in 1990) and all eight survived to fledge. The seven pairs at Quabbin produced only three chicks while the three pairs outside of Quabbin produced five. The average production, measured as chicks fledged/nesting pair, dropped to .89 from 1.17 a year earlier. Two of the Quabbin pairs failed as a result of the death of one of the adult birds. One bird was found to have died from the ingestion of a lead fishing sinker and the second was apparently killed by a predator. One of the four nesting rafts placed at Quabbin was occupied by a nesting pair. A fifth raft at Wachusett Reservoir was not used.

**Great Blue Heron Survey:** In 1991, the Division conducted the largest Great Blue Heron survey in its history. A total of 46 sites, some quite remote, were visited, and 37 were found to be active. Of these 37 active sites, 22 were traditional stations and 15 were

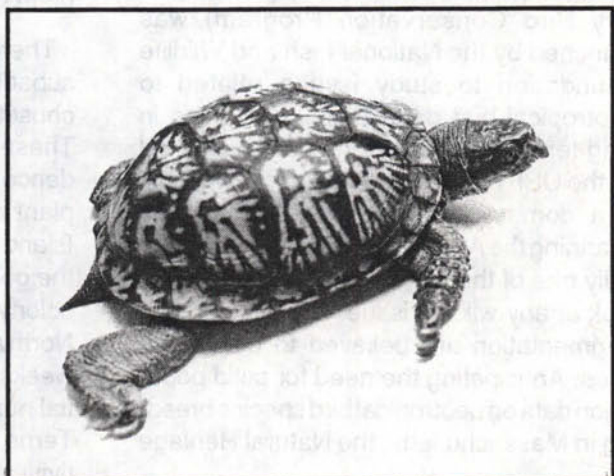
new since the last survey in 1989. The estimated total number of nesting pairs was 402, up 50% from the 266 estimated in 1989. These results document the highest number of breeding Great Blue Herons ever in the Commonwealth. The previous high was 308 pairs in 1985. The 37 active sites represent a 68% increase from the 22 sites documented in 1989. The average colony size was 11 nests and ranged from 1 to 68. A total of 903 young were counted at 333 nests for an estimated productivity of 2.71 young per nesting pair, which is exactly the same as in 1989. Using an estimate of two young per nest at active nests for which the chicks could not be well seen, and for half of the vacant nests from which young are believed to have fledged prior to the count date, a conservative estimate of 1,085 young produced statewide was derived.

## Mammals

**Right Whale:** The "Final Recovery Plan for the Northern Right Whale (*Eubalaena glacialis*)" was published in December 1991 by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service. The Right Whale Recovery Team, which included the Massachusetts Division of Fish & Wildlife's Assistant Director for Endangered Species, submitted a petition to the National Marine Fisheries Service urging, in part, that two areas off the Massachusetts coast, Cape Cod Bay and the Great South Channel, be designated as Critical Habitat under the federal Endangered Species Act.

## Reptiles & Amphibians

**Plymouth Redbelly Turtle:** Nesting of the Plymouth Redbelly Turtle began very early in the season in 1991, by the beginning of June. Between June 3 and July 1, 1991, a record 50 nests were located and





caged. Federal Pond was trapped with fyke nets, floating basking traps and baited hoop traps from June 20 to July 4, during which time 96 turtles were trapped, measured and released. All the turtles trapped and handled in Crooked Pond were previously head-started individuals; most appeared to be in good health and to have grown appreciably during the year prior to recapture. Emergence from nests began on August 29th. A total of 323 young were released after emergence or excavation from the nests, and 109 additional young were retained for headstarting. The latter group was distributed to headstarting agencies and individuals in October.

### Invertebrates

**Regal Fritillary:** No Regal Fritillary butterflies were found in surveys conducted in 1991 on Nantucket or Martha's Vineyard, with one unconfirmed observation reported from Nantucket. The Elizabeth Islands and Nomans Land were not surveyed. Biologists and researchers met at the end of the year to discuss further monitoring efforts, identification of limiting factors for the species, and management strategies including potential captive breeding. The future for this species in Massachusetts currently looks bleak.

**Northeastern Beach Tiger Beetle:** Adults were censused eight times between May 28 and October 5, 1991. The peak population counted was 926 on July 19. Hurricane Bob in mid-August cut back dunes and widened the beach by an average of 8.5m, reduced the numbers of adults to 10 percent of the number expected, and may have reduced the 1991 larval cohort by 50 percent. Due to the hurricane, a moderate decline in adults in 1992 is predicted, and a greater decline in 1993. Sites in Bristol County along Buzzards Bay, on Cape Cod and Martha's Vineyard were evaluated as potential reintroduction sites of the beetle. The most suitable sites identified were on outer Cape Cod.

**Puritan Tiger Beetle:** Surveys were conducted at known sites along the Connecticut River on six dates. Adult Puritan Tiger Beetles were observed from late June through mid-July, 1991. Absent from two previous sites, they were found at three. The total population was estimated to be in the vicinity of 40-60 individuals. This is comparable to numbers from 1988-90, but well below those observed in 1987. No data

on larval abundance were obtained in 1991. The site which had the greatest number of observed adults appears to have extensive visitation by boaters, although efforts to keep vehicles off the beach have been successful. Habitat does continue to change, as this site is expanding to the south and areas of past larvae observations have become covered with herbaceous vegetation. The overall population status is precariously low.

**American Burying Beetle:** In July 1991, the first visit was made to Penikese Island to determine the initial success of the reintroduction to Penikese Island; that is, whether or not any American Burying Beetles were successfully raised and had survived the winter. A total of 16 wild individuals were found during the four day stay. This is thought to have been only a portion of the American Burying Beetles that were actually present on the island. During this stay, an additional 30 individuals captive-raised at Boston University were released to augment the population resulting from the 1990 release. Although it is still too early to be confident, the initial results suggest that this effort to re-establish a wild population may succeed. Division staff and others will be monitoring this population annually for at least the next five years.

**Arrow Clubtail:** The Arrow Clubtail (*Stylurus spiniceps*) was independently rediscovered along the Connecticut River in July, 1991. This species of dragonfly had not been documented in the state for 75 years.

### Plants, 1991

The Program's botanist worked closely with staff of the New England Wild Flower Society on their New England Plant Conservation Program. Under this program, seeds of the rarest New England plant species are being collected, stored and propagated in a seed bank. In 1991, 17 Massachusetts rare plant species were targeted for seed collection and storage, although not all of these were successfully stored.

Some notable finds by the Program's botanist in 1991 were: the state's second population of the endangered Drooping Speargrass (*Poa languida*), the second and third populations of the threatened Shining Wedgegrass (*Sphenopholis nitida*), and the state's first verified native population of Hispid Pennyroyal (*Hedeoma hispida*).



## Natural Community Inventory, Research and Management, 1991

During the field season of 1991, the Program sponsored inventories of natural communities in the Connecticut and Deerfield River basins, with funds provided by the Nature Conservancy. The inventory identified high quality floodplain areas, cobble islands and shorelines along both rivers. Hickory-hornbeam community sites were located in the Connecticut River area, and became a plant community of particular focus for community description and inventory. Natural community descriptions of calcareous fens, particularly in southern Berkshire County, were contracted in conjunction with The Nature Conservancy, which expanded the sites to include Connecticut and New York for a regional perspective of the community.

A regional Coastal Plain pond inventory and community description effort was begun which included a week-long tour of sites in Maryland, Delaware, New Jersey, Long Island (NY) and Massachusetts, in order to establish similarities and differences among the areas. The effort to protect the only

Massachusetts mainland population of a rare plant (Creeping St. John's wort) at a coastal plain pond in Bourne continued with cutting back the aggressive giant reed grass that grows in competition with the rare plant over part of its population. The killing effects of salt from Hurricane Bob on pond shore vegetation were observed the week of the hurricane.

Ongoing research projects included visits to old-growth forest sites, with the awarding of a small research contract to inventory and map all the best old-growth forest stands in Massachusetts. The Program ecologist continued to be active in prescribed burn efforts for management of grassland and heathland habitat throughout the Islands and southeastern part of the state. She attended a workshop for training in prescribed burn techniques and theory in the Pinelands in New Jersey.

Because of damage from Hurricane Bob at Manuel F. Correllus State Forest on Martha's Vineyard, NHESP staff became involved in meetings to discuss the restoration of portions of that state forest to more open, grassland vegetation, which would also probably reduce the fire danger.

## Natural Heritage & Endangered Species Program Staff

Thomas French, *Assistant Director*

Henry Woolsey, *Program Coordinator*

Bradford Blodget, *Ornithologist*

Jay Copeland, *Environmental Reviewer*

Bill Davis, *Eagle Project Leader*

Gretchen Eliason, *Manager of Information Systems*

Diane Lauber, *Program Secretary*

Scott Melvin, *Rare Species Zoologist*

Paul Somers, *Botanist*

Patricia Swain, *Ecologist*

(Vacant), *Wetlands Wildlife Biologist*



## **Nongame Advisory Committee**

This committee met for its 100th time in March 1992. During this year a new practice of not holding a meeting during the month of August was initiated. Holding the October 1991 meeting away from the Westboro Field Headquarters at the Bascom Lodge on top of Mt. Greylock was another change from tradition. Priority agenda items included discussions of 1) long-term funding for the Program, 2) pond management as it relates to nongame species, and 3) exotic species issues. Other issues included:

- Review of the proposed Endangered Species Act regulations

- Review of the 30 1991 small contract project results

- Review of the 49 small contract proposals for 1992

- Review of the annual promotional campaign

- Review of the Program's proposed annual budget

- Discussion of proposed changes to the list of endangered, threatened, and special concern species.

- Beginning of a series of discussions to develop criteria for listing and delisting rare species.

Full members during FY92 were: Gwilym Jones, Chair; Kathleen Anderson; Marilyn Flor; Barre Hellquist; Tim Simmons; Doug Smith; Fred Greeley (until 12/91); and Pamela Weatherbee (from 1/92). Associate members were: Abigail Avery; Chris Leahy; Jim MacDougall; Mark Mello; William Patterson (until 7/91); and Mark Pokras.

## **Nature Preserves Council**

Draft regulations were submitted to legal staffs of DFWELE, DEM and EOE, and DEM and DFW senior staff. Comments were received and the draft regulations were modified to accommodate many of the practical and legal points raised. Lists of possible nominations were worked on by the agencies, and the Council discussed several draft nominations of potential nature preserves. The Secretary of EOE reappointed those Nature Preserves Council members whose terms had expired since the creation of the Council. The seven original Council members, Tim Simmons, Chair; Jeanne Anderson, Vice-chair; Kathleen Anderson, C. Barre Hellquist, Gwilym Jones, Paul Kress, and Doug Smith, continued to provide advice to the Division. Agency associates from EOE, DEM, and MDC, and staff from the Natural Heritage and Endangered Species Program continued to regularly attend the meetings.



# INFORMATION & EDUCATION

Ellie Horwitz  
*Chief, Information and Education*

The Information and Education Section has the responsibility and challenge of keeping sportsmen and the general public apprised of regulations, laws and recreational opportunities related to wildlife. It provides news about wildlife and maintains a flow of information on wildlife related issues. In order to enhance public understanding of wildlife matters and facilitate law enforcement, the Section maintains an active program of educational outreach to develop a public which is aware of and in tune with wildlife issues.

## Administration

During the course of the previous year it had become evident that the increasing amount of data being handled by the Section would be better maintained in an electronic data base. In an effort to obtain optimal use from our new computers and to streamline maintenance of the Section's copious records, the Chief and two staffers attended a workshop on "Word Perfect" offered by the Commonwealth.

During the fall a spreadsheet was designed to facilitate tracking of the Section's financial operations particularly with regard to the purchase of printing services. Other programs also benefitted from electronic data maintenance as the list of artists participating in the waterfowl stamp contests and the list of Fuertes Print sales were added to the Section's data bank. A database was developed to keep track of staff members and the uniform items which had been issued to them. The Section also installed a program which allows rapid translation of documents between the Macintosh and IBM systems. The first document to be "captured" and translated was the financial section of the 1989 Annual Report. Other administrative changes involved establishing a regular monthly reporting system — consistent with reporting procedures used by other Sections — for all I & E staff. This will eventually allow us to determine the real costs of conducting each of the I & E programs.

I & E efforts were bolstered during this period by the hiring of bookkeeper, Pat

McNamara. During this period the Section Chief reviewed and revised job descriptions for all Section staff as part of the Division's reclassification process.

## Response to Public Inquiry

As part of the task of meeting the public need for information, all Section members devote time to responding to specific inquiries which arrive by mail, by telephone or when people visit Field Headquarters with their questions. As it has always been the Section's policy to respond to all inquiries, this function can take up a considerable amount of staff time. In addition, staff members present informational programs on a variety of topics in all parts of the state and many also prepare written copy for use in the print media.

## Media Outreach

As part of this outreach the Section issued 18 press packets during calendar year 1991 containing 94 individual press releases. Each release is sent to more than 2,000 outlets. This is a calculated decrease from the number of packets (23) sent out during the previous year as part of a deliberate effort to reduce costs. News coverage was good and despite the decrease in output, there was a significant increase in press use of DFW news items (3,312 in 1991 as compared to 2,954 in 1990). The increase was most apparent in the area of news deriving from press releases issued.

This year the regular media offerings were enhanced by special media events focusing attention on the midwinter eagle survey and on the ceremonial release of broodstock Atlantic salmon into fishable waters around the state. Both were received with general enthusiasm. Two more sensitive media issues arose in connection with the MDC's controlled deer hunt at Quabbin Reservation and with an incident in which a moose appeared in a heavily settled portion of Natick on a Sunday afternoon. The resultant removal of the moose engendered a storm of public comment and required a week of intense attention by both wildlife and I & E administrators.



## Licenses

As required by law, the Section prepared and issued Abstracts of Migratory Bird Hunting Regulations for 1991, Licenses and Abstracts of the Fish and Wildlife Laws for 1992. This year, as last year, the Abstracts were prepared using word processing capabilities. This enabled the Section to send camera-ready copy to the printer, saving time and reducing errors.

In addition to preparing the licenses and abstracts of fish and game laws, the Division also issues three stamps each year. The Archery/Primitive Firearms stamp was selected through an open competition in May 1992 which was won by John Accica of Mendon, MA. Mr. Accica's design will be reproduced on the 1993 Archery/ Primitive Firearms stamp. The design for the 1992 Waterfowl stamp was also selected through an open competition held in September of 1991. This stamp design has been selected by competition since 1974. For this year the winning artwork was a Canvasback drake, carved by Benjamin Smith and painted by Racket Shreve of Salem, MA. Following the judging, all program entries were placed on display at the Peabody Museum, Salem.

The third stamp — the wildlands stamp — is printed on the reverse of the hunting/ fishing and trapping licenses. The design was simply the Division's seal in a rectangular format. While this is the official stamp, required of all sportsmen, the intent is to expand this program to collectors by introducing a collectible color version of the stamp and an associated art print. Because the Division does not maintain a marketing staff, it was determined that the production and sale of such prints would best be handled by a contractor familiar with the marketing of wildlife art. To this end the Section reviewed the art market and developed a request for proposal for a contractor. After an extended process which involved input and encouragement of a subcommittee of the Fisheries and Wildlife Board and the issuance of two sets of specifications for contractor services, a three year contract was signed with wildlife artist Randy Julius of East Bridgewater who will serve as sales coordinator for three years working with three different artists. A number of meetings were held to develop options for a Wildlands stamp and print program which will reach out beyond the license purchasing public. A full color edition of the stamps

will be produced and it will be accompanied by one or more editions of a print of the same artwork. Details of this program are still being reviewed by the Fisheries and Wildlife Board.

## Exhibits

The Division provided displays focussed on recreational opportunities in Massachusetts for the Eastern Fishing and Outdoor Exposition (Worcester), the Boston Sportsmen's Show (Boston) and the Springfield Sportsmen's Show (Springfield). Exhibits were also provided for Regional Fairs (i.e. Franklin Co. Fair — Connecticut Valley, Spencer Fair — Central District, Topsfield Fair — Northeast District, Bridgewater Fair — Southeast District). Smaller portable display boards, with photo exhibits designed to meet the particular needs of the day, were utilized at the Springfield Science Museum for Earth Day, The Massachusetts Environmental Education Society's Annual Conference in Worcester, a science education conference in Springfield and a social studies education conference at the JFK library in Dorchester. In addition, staff from the Natural Heritage and Endangered Species Program and staff from the Districts used these display boards on a number of occasions.

## Photography

The Photography Section continued to provide documentation of Division projects and programs. Photographs were provided to the media as needed. In addition, photographer Bill Byrne provided top caliber photographs for each issue of *Massachusetts Wildlife*, a task which often involved extensive photo assignments.

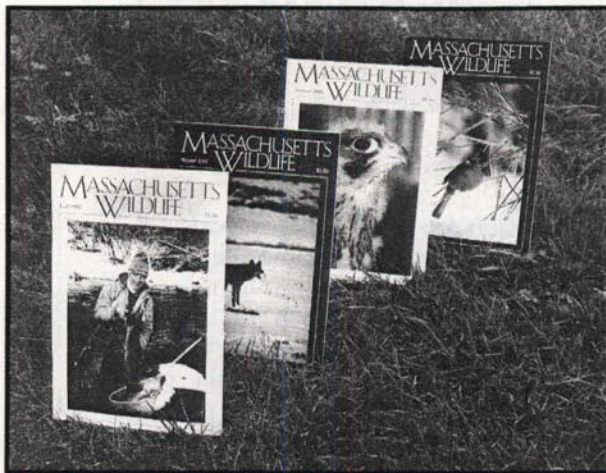
In an effort to better organize the Division's photo resources, the entire I & E staff put in two full workdays to assist photographer Bill Byrne in dealing with a backlog of both color and black and white materials.

## Publications

The major publication of the Division of Fisheries and Wildlife is *Massachusetts Wildlife*, a quarterly which reaches 19,000 subscribers.

The magazine covers a wide variety of subjects including wildlife management, habitat enhancement, articles about rare and endangered species, and "how to" articles for the hunter, angler or nature ob-





server. Numerous noteworthy articles were published during this year ranging in scope from wildlife management ("Update on Geese") to education ("A Watershed in Education") to key wildlife lands ("Saving the Schenob") to rare and endangered species ("Bay State Blanding's Turtles"). A particularly noteworthy piece was a comprehensive article on rabies which has, as a reprint, formed the backbone of the Division's response to inquiries about the rabies epizootic among raccoons.

Existing publications were reprinted and updated as needed. Among them were:

- trout stocking lists
- best bets for bass
- listing of areas stocked with pheasant and quail
- a listing of towns having special regulations having to do with the discharge of firearms.

The major new publications developed during this period were a set of five booklets of maps for Wildlife Management Areas (one booklet for each of the state's Wildlife Districts).

In addition to this set the Section prepared:

- Annual Reports for 1988 and 1989
- an index to pond maps
- a rabies fact sheet
- a rabies flyer
- a coyote poster
- an Animal Control Handbook (prepared by J. Cardoza)

- a Turkey Handbook (prepared by J. Cardoza)

The Section also oversaw preparation and printing of forms utilized in DFW programs, envelopes, stationery and all other printed materials.

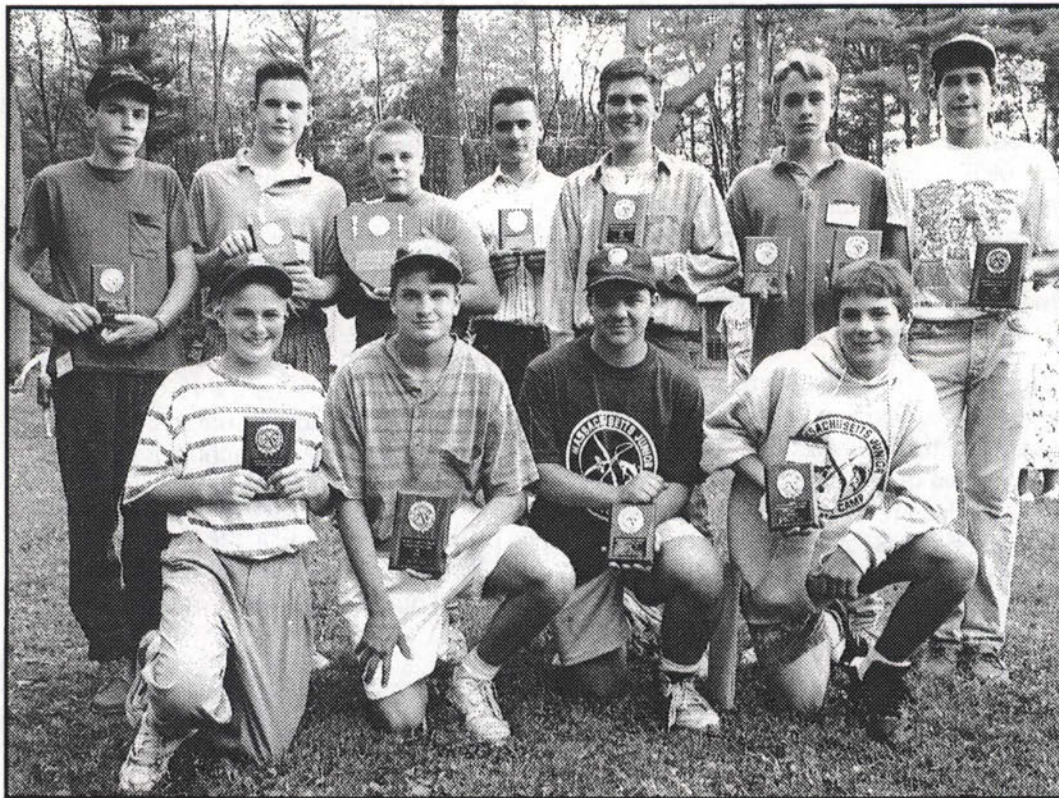
## Education

The Division continued to expand its educational outreach through a variety of programs:

**Conservation Camp:** As in the past the Division handled pre-camp publicity, administration, registration of campers and a complete revision of the camp's final exam. During the camp session I & E and District staff taught sessions on wildlife management, aquatic ecology, fish hatchery management and camping, and one staffer assisted in teaching the hunter education course. The Section also developed and administered the final examination and participated in the camp graduation exercises.

**Project WILD:** Forty-three workshops were held throughout the state in which a total of 741 educators were trained in the use of the WILD materials. This is a 50% increase over the number of educators who participated during FY 1991. A facilitators' training workshop drew 18 participants who are now active volunteers in the program. Of special interest was a series of workshops offered to Project Head Start teachers (preschool) in the Springfield and Chicopee areas. A newsletter was sent to all educators who had participated in a WILD workshop. It contained articles on anadromous fish, new science initiatives and a Flora and Fauna Field Guide Project by Auburn Middle School students. Project WILD was the source of several presentations to teachers' groups including the National Association of Science Teachers meeting in Boston, a statewide meeting of Vocational and Technical teachers held in Worcester and a gathering of education staff of the World Wildlife Fund, Hong Kong (this workshop conducted by Marion Larson while traveling in the Far East.) An appreciation event for WILD volunteers was held at the Needham Science Center in January of 1992 where facilitators had an opportunity to meet and mingle as well as to make creative educational displays for their own use. Both Marion Larson and WILD Coordinator Ellie Horwitz attended the National Project WILD Coordinator's Confer-





ence in Idaho which, as always, provided a wealth of ideas for program enhancement. On that occasion, Ellie Horwitz was honored by the national group and received the Director's Award for Excellence in Communication.

**Aquatic Resources Education:** The Aquatic Resources Education Program (AREP) continued to grow over this period. An Application for Federal Aid was prepared and approved for the next five year period. Displays at fairs and exhibits introduced the program to many new people and increased outreach to potential students and volunteer instructors. This year, instead of conducting training sessions to prepare new instructors, Coordinator Gary Zima opted to focus on the needs of the 145 instructors already in the program, providing more and better materials for them. Volunteer instructors conducted 26 sessions of the Basic Freshwater Fishing Course, reaching 620 students. They also participated in 47 Special One-Day Events, reaching an estimated 9,300 youngsters.

Planning for the program continues to take place at special planning meetings attended by workshop group liaisons, the program Coordinator, and as of January 1992, the Section Chief. "Shortcasts" continues as the program's newsletter providing updates about coming events, informa-

tion on workshop group activities and general program news. The program also held its fifth annual Volunteer Appreciation Event to express the DFW's gratitude to all who donated their time and services in extending the program to youngsters in the Commonwealth. This year the "thank you event" (which was held in July 1992) took the form of a family day and summer picnic.

**Watershed Education Project:** Seven schools joined the Massachusetts ranks this year, bringing the total of participating Massachusetts schools to 21. These schools joined 35 schools from New Hampshire in testing the waters of the Merrimack River and its tributaries. Macroinvertebrate sampling was added to the regime this year and was enthusiastically received by both students and teachers. This year many more students and teachers utilized the computer network made available by the University of Lowell.

The student congress was held at the University of New Hampshire, Manchester. Flight time was donated to the program by the Rev. Robt. Bryan, who provided photographer Bill Byrne and Videographer Dave Klinkhammer with an opportunity to obtain materials for a possible future slide show and video production. Teacher interest is high and project growth is anticipated. A



presentation on the project by Marion Larson was the central focus of the Massachusetts Audubon Society's (MAS) High School Conference in Worcester. The Section Chief provided guidance and support to a partnership of MDFW, Broadmeadow Brook Sanctuary (MAS) and Clark University in the preparation of a successful proposal to the EPA Environmental Education grants program for development of a similar program in the Blackstone River Watershed.

**Other Education Programs:** As in recent years, the Division participated in the **Massachusetts Envirothon**, setting up and managing two of the Envirothon's five stations — wildlife and aquatic resources. In a new venture, the Section offered a special program on decision making for the annual gathering of the student section of the **Educators for Social Responsibility**.

## Special Programs and Events

**Sportfishing Awards** — During calendar year 1990, 506 applicants qualified for award pins in 20 categories. None of the entries established new state records.

**Tags 'N' Trout** — During calendar year 1990, 36 sponsors issued prizes for fish in 49 bodies of water. Of the 964 fish tagged and released, 571 (59.2%) were returned. Calculating the donated prizes at their minimum value of \$20 each, this means that participating sponsors donated \$19,280 to promote fishing in Massachusetts.

**Fuertes Prints** — The Section continued to promote the sale of the five prints by Louis Agassiz Fuertes, although the promotional budget was greatly curtailed.

## Information & Education Staff

Ellie Horwitz, *Chief*

Bill Byrne  
Marion Larson  
Debbie McGrath  
Dan McGuinness  
Peter Mirick  
Denise Rozanski  
Gary Zima



## District Reports

Northeast District, Walter Hoyt, *Manager*

Southeast District, Louis Hambly, *Manager*

Central District, Chris Thurlow, *Manager*

Connecticut Valley District, Ralph Taylor, *Manager*

Western District, Tom Keefe, *Manager*

The five Wildlife Districts form the field presence of the Division of Fisheries and Wildlife, administering wildlife lands, conducting on-site management, and dealing with wildlife issues pertinent to their region.

Staff from the Districts conduct fisheries and wildlife surveys and help to gather data for research programs. They conduct trout and pheasant release programs and release northern pike and tiger muskies where appropriate. They operate checking stations where sportsmen register deer, bear, turkeys and furbearers. They serve as liaison with conservation organizations, including sportsmen's clubs, conduct educational programs within their district, and respond to individual and media inquiries. Another key activity of District personnel is to provide advice and technical assistance to persons and/or other agencies dealing with wildlife problem situations. In this context, District staff deal with a large number of beaver complaints, deer damage complaints and other issues dealing with wildlife impacts on human habitations/activities.

All District personnel distribute licenses, abstracts, stamps and other materials related to the sale of hunting/fishing/trapping licenses. They assist officers from the Division of Law Enforcement to assure public adherence to wildlife laws and regulations, and they assist the staff of the Division's Wildlife Lands Section in locating titles and landowners, and in making arrangements for the Division's acquisition of lands for wildlife.

During the past year District staff once again participated in numerous research programs including the mid-winter eagle survey, waterfowl inventory and banding, census of mourning doves, woodcock and quail, and a survey of great blue heron rookeries. They also monitored water quality of lakes and streams prior to releasing fish into them. District staff reviewed the Environmental Monitor for development projects that would affect wetland areas and provided technical advice on the con-

trol of environmental problems — particularly in the handling of nuisance animal situations. District managers served as the Division's public relations/education outreach, spending many hours with civic and sportsmen's groups and responding to inquiries from interested citizens.

All Districts offered programs which introduce visitors to the Division and its activities. All participated in the release of specially tagged fish for the Division's Tags'n'Trout program. All Districts actively managed wildlife management areas in their region. This involved brushcutting, mowing, trimming trails, designing forest cutting operations, planting shrubs and maintaining roads and parking areas. It also involved the maintenance of nesting boxes for wood ducks, bluebirds and purple martins, and the establishment of cooperative agreements with farmers raising crops on DFW lands. Maintenance was also needed on Division buildings and vehicles.

In addition to the activities that are common to all of the Districts, there were certain projects which required the participation of staff from only certain Districts.

Staff of the **Northeast District** monitored activities at nine Wildlife Management Areas, five sanctuaries and six boat launching ramps. The areas in this District receive particularly heavy public use and the District was called upon to issue 95 camping permits and 350 target range permits during this period. The District manager represented the Division at more than 70 meetings, including sessions of conservation commissions, County Leagues of Sportsmen's Clubs, Watershed Associations, town meetings and Goals meetings for Walden Pond and for the Harold Parker State Forest. As in past years, the staff of the Northeast District designed and manned an exhibit at the Topsfield Fair and assisted at exhibits at the New England Sportsmen's Show (Boston) and at the Eastern Fishing Exposition (Worcester). District staff continued their active participation in the state's



Youth Upland Game Hunt and the Youth Waterfowl Hunt. These events are co-sponsored by the Essex County League of Sportsmen and the U.S. Fish and Wildlife Service (waterfowl hunt only) and are open to interested young sportsmen from any part of the Commonwealth. District staff continued to monitor a special waterfowl hunting program at the Delaney Wildlife Management site in Boxborough and at the Martin Burns Wildlife Management Area in Newbury. District staff also dealt with 90+ complaints related to beaver activity. District staff particularly monitored events in the town of Chelmsford, where voters had closed the town to trapping. Because of the increase in problems caused by beavers, citizens voted to overturn the trapping ban in the spring of 1992.

During this year, the **Southeast District** focussed particular attention on the Crane Wildlife Management Area in Falmouth. On the Crane W.M.A. 100 acres were brushcut; 29 acres were top-dressed with fertilizer; and 46 acres were top-dressed with lime. Thirteen miles of trail were trimmed and mowed; 50 acres of woodland understory were mowed; 3.5 acres were planted to annual grains and 81 acres of field were treated to remove pitch pine and willow intrusions.

Other management efforts involved erection and maintenance of signs, gates and parking areas on nine wildlife management areas. Like the Northeast District, this Dis-

trict too managed a special hunt — for archery, shotgun and/or primitive firearms hunting for deer at the Otis/Edwards Military Reservation in Bourne and Sandwich.

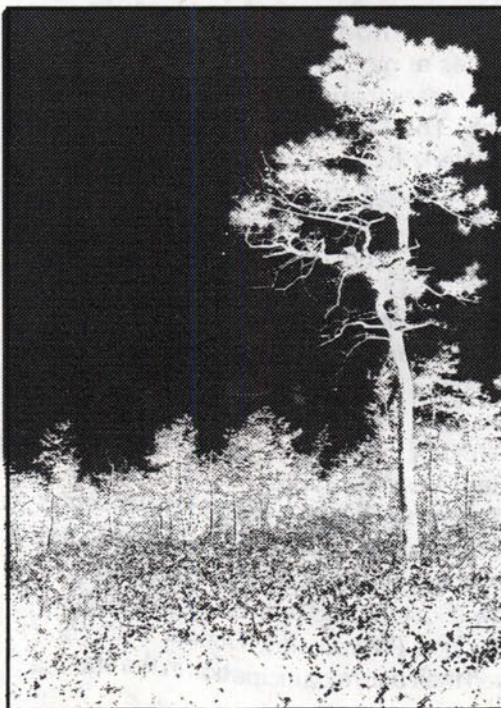
During the spring, staff maintained 209 wood duck nesting boxes and added 13 new ones. One osprey nesting platform was replaced and 34 bluebird nesting boxes were erected. Census counts were conducted for mourning doves, woodcock and bald eagles. Staff from this district assisted waterfowl biologist H Heusmann with a summer program of banding and neck collaring of Canada Geese and with subsequent monitoring and counts of birds so marked.

Hurricane Bob, which came through in August of 1991, caused extensive damage at the Sandwich Fish Hatchery with the result that District staff spent considerable time assisting in facilities restoration efforts.

Fisheries operations focussed on assessing profiles of 17 trout ponds to determine the amount of trout habitat available. Lake surveys were performed on Hathaway's Pond in Barnstable, several ponds at the Rochester Rearing System, and Herring River Reservoir.

Upper Lagoon Pond in Oak Bluffs was surveyed in cooperation with the Division of Marine Fisheries. More than 15 streams were sampled to provide information for use in Environmental Reviews. Stream surveys concentrated on the Narragansett Bay and South Coastal drainages. Several populations of native brook trout were documented and inventory was conducted on populations of sea-run trout in the Quashnet and Mashpee Rivers. In May, Johns Pond and Lake Sabbatia were sampled as part of a statewide black bass project; a winter ice-fishing survey of several bass ponds was conducted, and Hobart's Pond in Whitman was sampled to evaluate it for possible introduction of smallmouth bass.

An increasing amount of technical assistance was provided to state agencies, private consulting firms and private individuals. Due to input from District and Field Headquarters' Fisheries staff, the Division is now actively involved in the permitting process for water withdrawals. This participation is particularly important for the ground-water-dependant trout ponds on Cape Cod.





A large fishkill of young-of-the-year herring in a ditch near Walker's Pond, Brewster was investigated in cooperation with the Division of Marine Fisheries. Fishkills were investigated at Billington Sea in the summer of 1991 and the spring of 1992, and natural fish kills were investigated in Monponsett Lake, Halifax and several other bodies of water.

**Central District** staff were involved with the ongoing activities common to all of the Districts. As a matter of record, pheasant rearing and stocking was coordinated out of this office, managed by the District Supervisor, as it has been for the past seven years.

Staff of this District surveyed 10 streams and seven ponds. Age and growth analysis, food habits and spawning success studies were carried out on Landlocked Salmon and Lake Trout at Wachusett Reservoir. Research was conducted on Landlocked Alewives at South Pond. Rainbow Trout carryover and growth studies were continued at Wallum Lake and Northern Pike were sampled for growth and harvest rates at South and Quaboag Ponds.

A variety of signs — boundary markers and other informational signs — were posted on all Wildlife Management Areas as needed. New signs and gates were installed on new Wildlife Management Areas. Fields were brushcut on six Wildlife Management Areas; roads and parking lots were maintained on six areas.

The District Manager attended meetings of the Worcester Co. League of Sportsmen's Clubs and attended meetings with local and state agencies on such issues as highway construction, wetlands permits and wildlife issues. Informational programs were presented to civic and sportsmen's groups and technical assistance was provided as needed — including response to 38 complaints of beaver damage.

In addition to the activities in which all Districts participated, the staff of the **Connecticut Valley District** conducted certain programs specific to the Valley. Among these was the release of Atlantic salmon fry into the tributaries of the Connecticut River as part of the Anadromous Fish Restoration Program. District staff also stocked landlocked salmon from the Walter Reed Hatchery into Quabbin Reservoir. During this

period District staff disassembled the Whetstone Brook research site and the remaining materials at the Pelham eagle hacking site, refitted the electric shock boat to meet new specifications, and erected gates at the Swift River, Montague and Pauchaug Wildlife Management Areas. District staff conducted 12 Canada goose drives, banding and neck collaring birds for a migration study, and assisted in monitoring the controlled deer hunt at Quabbin Reservation. They operated a small wilderness camping area on the Swift River Wildlife Management Area and conducted a special waterfowl hunt at the Ludlow Area. This latter activity included erecting hunting blinds, preparing access and administering the hunt through a permit system.

Staff from the **Western Wildlife District** continued their active involvement with ongoing programs including operation of check stations, release of trout and pheasants, and provision of technical assistance. Staff conducted maintenance and improvement activities on Wildlife Management Areas and established cooperative agreements with area farmers. They monitored water chemistries to establish data needed for stream management, handled inquiries from the public and provided technical assistance to town conservation commissions, and to county, state and federal agencies involved with the permitting of various construction or development proposals. Staff constructed new wood duck boxes and checked established ones for signs of use. They participated in eagle, woodcock, Mourning Dove, Peregrine Falcon and Mallard/Black Duck surveys, and they continued the breeding bird census on the Hy Fox Wildlife Management Area. As in the past, staff from this District took the lead in capturing wild turkeys for translocation to other parts of the Commonwealth. Once again the District staff planned, prepared and conducted a special deer hunt for paraplegic sportsmen in the northern Berkshires as they have each year since 1978. District fisheries personnel monitored water temperatures and water chemistries on a number of streams to establish baseline data necessary for stream management programs.



## **District Personnel**

### **Northeast District:**

Walter Hoyt, *Manager*  
Al Ortiz, *Game Manager*  
Peter Jackson, *Fisheries Manager*  
Dave Ford  
Lawrence Howie  
Frank O'Meara  
Sue Ostertag

### **Southeast District:**

Louis S. Hambly, Jr., *Manager*  
Richard Turner, *Game Manager*  
Steve Hurley, *Fisheries Manager*  
Ernest Green  
Ed Kraus  
Camie Marsh  
Richard Norton  
Kenneth Weaver

### **Central District:**

Chris Thurlow, *Manager*  
Michael Ciborowski, *Game Manager*  
Lee McLaughlin, *Fisheries Manager*  
Dave Carlson, *Birch Hill WMA Supervisor*  
Paul Le Boeuf  
Priscilla MacAdams  
Arthur Myers  
Paul Orrizzi

### **Connecticut Valley District:**

Ralph Taylor, *Manager*  
Peter Pekkala, *Game Manager*  
John O'Leary, *Fisheries Manager*  
Barbara Bourque  
Gary Galas  
John Nowakowski, Jr.  
James Wright  
Martin Wrubel

### **Western District:**

Tom Keefe, *Manager*  
Anthony Gola, *Game Manager*  
Leo Daly, *Fisheries Manager*  
Dale Beals  
Elna Castonguay  
Joseph Kirvin  
David St. James  
Jerry Shampang



# Realty

William J. Minior  
Chief, Wildlife Lands

FY 92 marked the initial year of Wildland Stamp acquisitions for the Division of Fisheries & Wildlife. Although only six tracts were recorded in FY 92, many additional parcels were acquired with 92 funding. These transactions will be completed in the upcoming months. Efforts to acquire land throughout the Commonwealth with Wildlands Stamp funding are underway and should hopefully satisfy the sportsmen who have willingly agreed to contribute for the acquisition of additional open space.

Bond Funds did not become available until late in the fiscal year which made completion of bond fund acquisitions in FY 92 unrealistic. Most FY 92 bond funds were encumbered, however actual completion of said transactions will not occur until early/mid FY 93. Once again the MDC/DFWELE joint watershed protection account designated for lands within the Quabbin, Ware, and Wachusett watersheds was used to complete thirteen acquisitions in the Connecticut Valley and Central Wildlife Districts. Three of these acquisitions were Conservation Restrictions which protect watershed properties while leaving the property on the tax rolls. These acquisitions primarily add to existing protected areas and provide substantial wildlife habitat and recreation in addition to watershed protection.

Direct third party efforts on behalf of Mount Grace Land Conservation Trust, Inc. and the Connecticut River Watershed Council, Inc. assisted in approximately one-fourth of FY 92 acquisitions. Non-profit assistance has proven to be most valuable in completing transactions within a time frame most difficult under the state bureaucracy.

## Western District

Expended	\$00.00
Acreage	0.00
Cost/Acre	\$00.00

## Valley District

Expended	\$111,100.00
Acreage	144.00
Cost/Acre	\$771.53

## Central District

Expended	\$1,871,235.00
Acreage	911.00
Cost/Acre	\$2,052.04

## Northeast District

Expended	\$00.00
Cost	0.00
Cost/Acre	\$00.00

## Southeast District

Expended	\$00.00
Acreage	0.00
Cost/Acre	\$00.00

<b>Total Expended:</b>	<b>\$1,982,335.00</b>
<b>Total Acreage Acquired:</b>	<b>1,055.89</b>
<b>Ave. Cost Per Acre:</b>	<b>\$1,877.41</b>

Above figures include Departmental acquisitions. It should be noted that only the acreage and costs of those properties RECORDED in FY 92 are utilized herein.

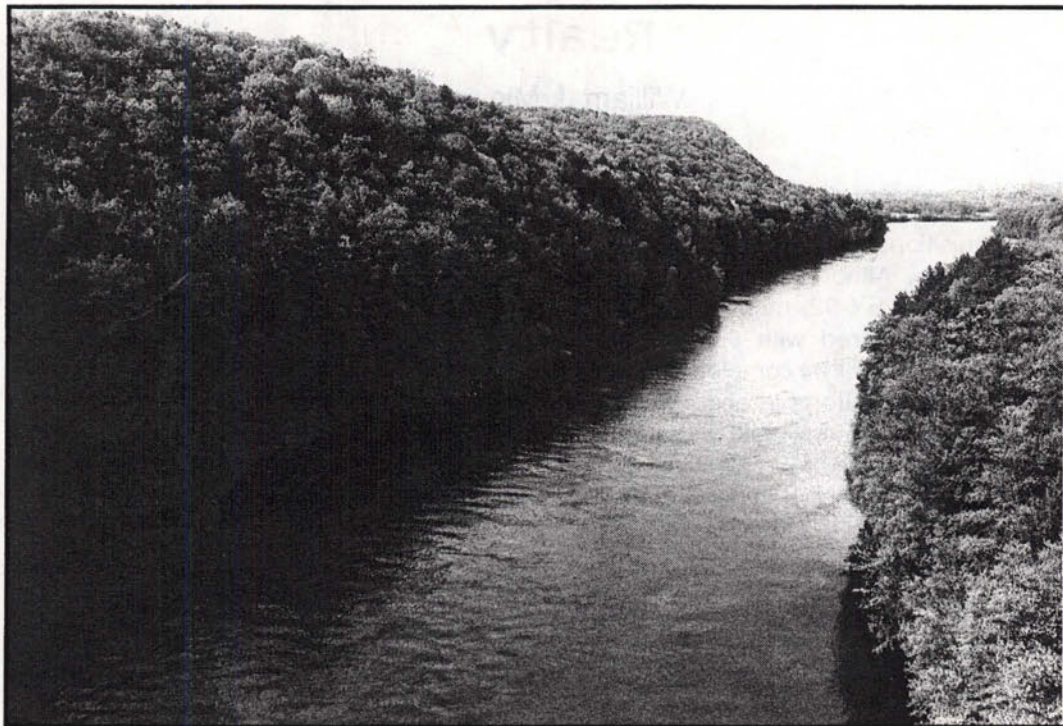
## WESTERN DISTRICT

Although no new acquisitions were recorded in the Western District, considerable acquisition effort was spent on contracts and negotiations of priority parcels throughout the district. Title problem relating to planned acquisitions have forced many potential closings into FY 93. The lack of General Fund bond money early in the fiscal year significantly affected completion of protection efforts in the Western District in FY 92.

## VALLEY DISTRICT

The Connecticut River Watershed Council, Inc. assisted on three acquisitions abutting the Montague WMA, increasing this valuable area to nearly 700 acres. Access, habitat protection and watershed protection were the primary reasons for these additions. Two tracts comprising fifty-nine acres were acquired with the MDC/DFWELE watershed protection account in the Town of Wendell, further protecting wildlife habitat and providing recreational opportunity. Groundwork for many additional acquisitions was accomplished in FY 92 and will result in many FY 93 recordings.





### **CENTRAL DISTRICT**

Fourteen acquisitions totalling 912 acres were recorded in FY, 92. The MDC/DFWELE Watershed account was used for all but three of these acquisitions. Conservation Restrictions were used in three areas in lieu of acquisition. Protection of valuable wetland and upland resources under this account continue to provide much needed habitat protection and recreational opportunity in the existing watersheds. General Bond Acquisition funding was not available until late in the FY, however it did account for considerable acquisition effort which will result in FY 93 recordings. The 150-acre Lackey Pond WMA was a most generous gift from White Consolidated, Inc. This acquisition will help to insure protection of valuable wetland in the Towns of Sutton and Uxbridge. Cusky Pond in New Braintree was given to DFW by the US Farmers Home Administration for wetland protection purposes, and the Sputtermill Pond Area in Petersham was acquired through watershed funding. Over 20,700 acres have now been protected through acquisition or CR in the Central District.

### **NORTHEAST DISTRICT**

No acquisitions were recorded in the NE District in FY 92, however a considerable amount of acquisition work was conducted encumbering FY 92 funds. Recordings in early FY 93 will reflect this effort. Additional tracts were also targeted for FY 93 acquisition.

### **SOUTHEAST DISTRICT**

Acquisition efforts in the SE District in FY 92 concentrated on the Crane WMA. Unfortunately, title problems prevented closings on targeted parcels. Title work on several gifts and a small tract abutting the Rocky Gutter WMA was also conducted, but recordings will not occur until early FY 93. The lack of a land agent in this district has proven to be somewhat of a problem in addressing everyday realty issues and in pursuing potential new acquisitions.



# Federal Aid

R. Stewart McCaig  
*Coordinator*

Federal apportionments to Massachusetts continued at a high level throughout the fiscal year. The DFW shared a total \$2,028,000 equally with DMF in management and access for freshwater and saltwater fisheries in accordance with regulations of the Wallop-Breaux amendment to the Sport Fish Restoration Act. The regulations also require states to use 10% of their apportionments for access to fishery and boating resources, and accordingly, during the year, DFW submitted plans for new coastal access construction at Fairhaven and Newburyport. In these and other site construction contracts, the Coordinator selected sites from the files of the Mass. Public Access Board. Beginning in October, 1991 the US Fish & Wildlife Service relaxed restrictions on federal participation in fish propagation, and the DFW submitted a project to recover the federal share of operation and maintenance costs for this significant DFW budget item. Fisheries personnel continued their existing research and development programs and made additional plans for federally-aided studies of largemouth bass, the state's most important freshwater game fish.

The federal apportionment for wildlife restoration \$1,450,500, was the second highest on record to be available under the Pittman-Robertson Program for projects in wildlife management and hunter education. Federal management funds went predominantly into studies of population trends and harvest surveys (Project W-35-R) and to wildlife development work on DFW-owned management areas (W-9-D). Continuing existing efforts to improve safety and ethical behavior among hunters, DFW also included a line item appropriation in its wildlife budget for use by Mass. Division of Environmental Law Enforcement officers in hunter education. Both wildlife management and hunter education programs are regulated under the federal Wildlife Restoration (P-R) Act.

Beginning in December, the Coordinator became involved in a federal review of civil rights compliance. Issues were Title VI of the Civil Rights Act of 1964 that assures all

persons the rights and benefits of federal programs, irrespective of race, color, or national origin; and also Section 504 of the Rehabilitative Act of 1973 that mandates reasonable accommodation in the benefits of these programs of persons who are mentally, physically or sensorially impaired. This review led to on-site inspection of progress made in handicapped accommodation to compare with previous review of the same subjects in 1988 and eventually to preparation of a Self-Evaluation and Transition Plan filed in August, 1992. The Division agreed to implement unresolved features of the plan by September, 1995. Additional compliance issues were submission of "assent legislation", i.e. the Acts and Resolves that authorize the Division to conduct federally-aided wildlife and fisheries restoration projects; and assurance that the interest from license revenues are used only for these projects.

In March, state auditors began an examination of federal aid records for FY90 and FY91, and the Coordinator provided assistance as required. He was also involved routinely with assistance to the Div. of Marine Fisheries and to the Mass. Public Access Board in reimbursement of saltwater project costs and of access site construction costs.

According to a commitment made at the 1990 Federal Aid Coordinator's Conference, Washington, D.C., Massachusetts hosted the 1991 Conference. The event occurred from October 5th to the 8th at the Seacrest Motel in Falmouth. Those who attended represented thirteen states of the U.S. Fish & Wildlife Service Northeast Region as well as the District of Columbia.



# Maintenance and Development

Stephen Henry  
*Senior Planner*

The Division continues to maintain and upgrade its facilities. The following are highlights of those efforts.

The **Northeast Wildlife District** continues to conduct routine maintenance at two of its Wildlife Management Areas. Five hundred tons of gravel were purchased for road and parking lot maintenance at Martin Burns and Squannacook WMA's.

In an effort to upgrade its office facilities, the **Southeast Wildlife District** converted a two-car garage into four offices. A small gasoline storage shed was also constructed behind the District offices.

The **Western Wildlife District** had the Peru Wildlife Management Area boundary surveyed.

The **Central Wildlife District** had some repair work done to the driveway leading to the District office. A considerable number of cracks were filled and sealed, prolonging the life of the roadway.

**Westboro Field Headquarters** maintenance included exterior painting of the dormers and fascia and installation of a new fiberglass shower in the basement. A new stainless steel sink was installed in the wildlife lab and a security fence was installed around the outside walk-in freezer.

Because of vandalism problems at the **Ayer Game Farm**, a motion and fire detection system was installed.

## Hatcheries:

An existing gravel-packed well was redeveloped at the **McLaughlin State Fish Hatchery** and a river pump was replaced. In a continuing effort to develop an additional source of water at the McLaughlin Hatchery, an 8-inch test well was installed, tested and developed, yielding an excellent water supply. This well will be further developed next year. The entire McLaughlin complex had new shingles installed on all roofs. The **Palmer Hatchery** continued to improve its backup power system by upgrading its electrical and fuel line components. Capital improvements to the **Sunderland and Sandwich State Fish Hatcheries** continue to be funded by State Capital Outlay monies. Sunderland Hatchery had the following work completed: Approximately 10,000 yards of gravel was laid as site preparation for future installation of 40 fiberglass rearing pools. A vertical turbine pump was installed on a 24-inch gravel-packed well which was developed last year. Also, piping was run from the new well to the future pool site. Sandwich Hatchery had a new 24-inch gravel-packed well installed and developed. Repairs and upgrading of the electrical system were also completed.





# Legislative Report

## **Chapter 138, Section 49 General Appropriation Act for Fiscal Year 1992 Signed: July 10, 1991**

Section 49. Directs the Division to assume all game biology needs and jurisdiction on watershed lands under the jurisdiction of the Metropolitan District Commission. This serves to reinforce the Division's existing authority over all fisheries and wildlife management in the Commonwealth.

## **Chapter 364 An Act Relative to the Harassment of Hunters, Fishermen, and Trappers. Signed: December 19, 1991**

This prohibits the obstruction, interference, or harassment of those involved in the lawful taking of fish or wildlife and provides for penalties.

## **Chapter 406 An Act Designating the Wild Turkey as the Game Bird of the Commonwealth Signed December 23, 1991.**

Designated the wild turkey (*Meleagris gallopavo*) as the state's official game bird and as the game bird emblem of the Commonwealth.



# Personnel Transactions

## FY 92 Personnel Transactions

7/1/91 - 12/31/91

### New Hires

Salvatore Paterno	Laborer I	7/7/91
Craig Lodowsky	Fish Cult. Asst.	8/4/91
Patricia McNamara	Typist II	9/28/91
Richard Hartley	Aquatic Biol. II	11/17/91

### Promotions

Jerry Shampang	Laborer I to Laborer II	7/1/91
Robert Bennett	Laborer I to Laborer II	7/1/91
John Kopinto	Laborer I to Laborer II	8/4/91
Alberto Ortiz	Laborer II to Fish & Game	
	Mgmt. Spec.	10/6/91
Kenneth Simmons	Aquatic Bio. I to Aquatic Bio. II	11/3/91

### Transfers

Carl Hanson	Laborer I from McLaughlin to Bitzer	10/6/91
Robert Bennett	Laborer II from Central to Ayer	9/22/91
Matthew Trainor	Laborer I from Westboro to Ayer	
	Seasonal to Perm.	12/1/91

### Leave of Absence

Salvatore Paterno	Laborer I, Indust. Accident	10/21/91
George Moore	Laborer I, Susp. 2 Days	10/10/91 - 10/12/91

### Miscellaneous

Nancy Limosani	Clerk V from Full-Time to Part-Time 30 hours/wk.
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### Terminations

Chester Kopinto	Laborer II	7/1/91	Retired
Amy Derosier	Laborer I	7/3/91	Term. Seas.
Jeffrey Lear	Laborer I	7/6/91	Term. Seas.
James Lear	Laborer I	7/6/91	Term. Seas.
Jeanne Cooper	Laborer I	7/14/91	Term. Seas.
Harvey Atkins	Laborer I	7/15/91	Term. Seas.
Diane Lauber	Clerk IV	7/21/91	To be paid by Nature Cons.
Jon Sojka	Laborer I	7/26/91	Term. Seas.
Joseph Camas	Laborer I	8/23/91	Term. Seas.
Thomas Sheehan	Fish & Game		
	Mgmt. Spec.	9/6/91	Retired
Shawn O'Malley	Laborer I	9/6/91	Term. Seas.
Bruce Sorrie	Env. Analyst I	9/25/91	Resigned
James Guthrie	Laborer II	11/29/91	Term. Seas.

1/1/92 - 6/30/92

### New Hires

Todd Richards	Aquatic Biologist I	1/21/92
Jon Sojka	Laborer I (seasonal)	4/6/92
Robert Chapin	Laborer I (seasonal)	4/13/92
Scott Ewell	Laborer I (seasonal)	4/13/92



James Guthrie	Laborer II (seasonal)	4/26/92
Shawn O'Malley	Laborer I (seasonal)	4/26/92
Jeffrey Lear	Laborer I (seasonal)	5/6/92
James Lear	Laborer I (seasonal)	5/6/92
Jeanne Cooper	Laborer I (seasonal)	5/6/92
Paul Somers, Jr.	Environmental Analyst I	5/17/92
Amy Derosier	Laborer I (seasonal)	5/22/92
Frederick Richards	Laborer I (seasonal)	5/26/92
Joseph Camas	Laborer I (seasonal)	5/26/92
Robert Deblinger	Program Manager IV	5/31/92

#### Promotions

Walter Godinho	Laborer I to Laborer II	1/2/92
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#### Miscellaneous Transactions

William Davis	Game Bio. I	1/12/92	Reall.
Gary Vecellio	Game Bio. II	1/12/92	Reall.
Jennifer Haug	Bacteriologist	3/16/92	Temp. Cert.
Paul Somers	Env. Analyst I	5/17/92	
John Buckley	Admin. IV	1/27/92	Reall.
Thomas French	Program Mgr. V	1/27/92	Reall.
Richard Hartley	Aquatic Bio. III	3/22/92	Reall.
Eleanor Horwitz	Program Mgr. III	3/22/92	Reall.
Jack Almeida	Game Cult. I	3/22/92	Reall.
Richard Burrell	Game Bio. II	3/22/92	Reall.
Michael Ciborowski	Game Bio. I	3/22/92	Reall.
Wayne MacCallum	Admin. VIII	3/22/92	Reall.
Robert Bellville	Fish & Game	3/22/92	Reall.
	Mtg. Specialist		
James Cardoza	Game Bio. III	3/22/92	Reall.
Joseph Bergin	Aquatic Bio. III	3/22/92	Reall.
Richard Keller	Aquatic Bio. III	3/22/92	Reall.
John Sheedy	Game Cult. I	3/22/92	Reall.
Stephen Hurley	Aquatic Bio. III	3/22/92	Reall.
Richard Turner	Game Bio. I	3/22/92	Reall.
Alan Aittaniemi	Fish Cult. II	3/22/92	Reall.
Michael Masley	Fish Cult. II	3/22/92	Reall.
Craig Lodowsky	Fish Cult. I	3/22/92	Reall.
Nancy Melito	Fiscal Officer IV	3/22/92	Reall.
David Fredenburgh	Fish Cult. III	3/22/92	Reall.
Peter Pekkala	Game Bio. I	3/22/92	Reall.
Robert Arini	Fish & Game	3/22/92	Reall.
	Mtg. Specialist		
Stephen Foster	Game Cult. II	3/22/92	Reall.
William Easte	Aquatic Bio. II	3/22/92	Reall.
Robert McCaig	Aquatic Bio. III	3/22/92	Reall.
Walter Hoyt, Jr.	Dist. Fish & Game	3/22/92	Reall.
	Supervisor		
John Besse Jr.	Fish Cult. I	3/22/92	Reall.
Kenneth Simmons	Aquatic Bio.	3/22/92	Reall.
Chas. McLaughlin Jr.	Aquatic Bio. I	3/22/92	Reall.
John Sousa	Fish Cult. I	3/22/92	Reall.
Peter Jackson	Aquatic Bio. II	3/22/92	Reall.
John Williams	Fish Cult. II	3/22/92	Reall.
John O'Leary	Aquatic Bio. III	3/22/92	Reall.
Mark Tisa	Program Mgr. V	3/22/92	Reall.
Louis Hambly	Dist. Fish & Game	3/22/92	Reall.
	Supervisor		



Arthur Pellegri	Fish Cult. I	3/22/92	Reall.
John Scanlon	Game Bio. III	3/22/92	Reall.
Leo Daly	Aquatic Bio. I	3/22/92	Reall.
Frank Pietryka	Fish Cult. II	3/22/92	Reall.
James Hahn	Fish Cult. II	3/22/92	Reall.
Chris Thurlow	Dist. Fish & Game Supervisor	3/22/92	Reall.
Robert Madore	Aquatic Bio. III	3/22/92	Reall.
Anthony Gola	Game Bio. I	3/22/92	Reall.
Mark Brideau	Game Cult. I	3/22/92	Reall.
Gary Zima	Aquatic Bio. I	3/22/92	Reall.
Todd Richards	Aquatic Bio. II	3/22/92	Reall.
David Basler	Aquatic Bio. I	3/22/92	Reall.
Thomas Keefe	Dist. Fish & Game	3/22/92	Reall.
Carl Prescott	Program Mgr. IV	3/22/92	Reall.
Ralph Taylor	Dist. Fish & Game Supervisor	3/22/92	Reall.
Thomas Early	Game Bio. II	3/22/92	Reall.
William Byrne	Game Bio. I	3/22/92	Reall.
Thomas Decker	Game Bio. III	3/22/92	Reall.
Kurt Palmateer	Fish Cult.	3/22/92	Reall.
Holly Hubert	Fish Cult. I	3/22/92	Reall.
H Heusmann	Game Bio. III	3/22/92	Reall.
Alberto Ortiz	Game Bio. I	3/22/92	Reall.
Juliette Santos	Admin. Asst. II	3/29/92	Reall.
Lillian Hew	Accountant	4/5/92	Reall.
Mary Lou Raples	Clerk III	4/5/92	Reall.
Elizabeth Sienczyk	Admin. Services Coordinator	4/5/92	Reall.
Priscilla Cancellieri	Clerk III	4/13/92	Reall.
Stephen Henry	Aquatic Bio. II	5/17/92	Reall.
Helen Yung	Clerk III	5/17/92	Reall.
Nancy Limosani	Prog. Coord. I	5/17/92	Reall.
Ruth Ann Surette	Clerk III	5/17/92	Reall.
Dan McGuiness	Game Bio. I	5/17/92	Reall.
Marion Larson	Game Bio. I	5/17/92	Reall.
Peter Mirick	Game Bio. II	5/17/92	Reall.
Yunus Khalifa	Clerk III	5/18/92	Reall.
Robert Deblinger	Program Mgr. V	5/31/92	Reall.
Man Lui	Clerk III	6/1/92	Reall.
Patricia Swain	Conser. Bio. III	6/1/92	Reall.
Paul Somers	Conser. Bio. III	6/1/92	Reall.
Jay Copeland	Conser. Bio. III	6/1/92	Reall.
Bradford Blodget	Conser. Bio. III	6/1/92	Reall.
Scott Melvin	Conser. Bio. III	6/1/92	Reall.

### Terminations

Steven Williams	Admin. V	Resigned	2/2/92	7 yrs.
William Mikelk	Laborer I	Resigned	5/8/92	7 yrs.
Steven Roble	Game Bio. II	Resigned	6/1/92	5 1/2 yrs.
Amy Derosier	Laborer I	Term. Seas.	6/20/92	
Jon Sojka	Laborer I	Term. Seas.	6/21/92	
Scott Ewell	Laborer I	Term. Seas.	6/30/92	



**Financial Staff:**

Nancy Melito, *Assistant Director, Fiscal Affairs*

Prisilla Cancellieri

Mary Cavaliere

Lillian Hew

Yunis Khalifa

Nancy Limosani

Carl Lui

Mary Lou Raples

Elizabeth Sienczyk

Ruth Ann Surrette

Helen Yung



# How the Sportsmen's Dollar was Spent

July 1, 1991 to June 30, 1992

<u>PROGRAMS/ASSESSMENTS</u>	<u>EXPENDITURES</u>	<u>PERCENTAGES</u>
Administration:		
Administration	758,959	
Information-Education	<u>324,724</u>	
Total	1,083,683	11.71%
Fisheries and Wildlife Programs:		
Hatcheries	1,042,625	
Game Farm	182,986	
Cooperative Units	160,500	
Fisheries and Wildlife Management	<u>2,472,410</u>	
Total	3,858,521	41.71%
Other Programs:		
Construction and Development of Facilities	132,550	
Equipment	250,063	
Mass. Wildlife Magazine	117,588	
Land Acquisitions	1,420,937	
Waterfowl Management Program	67,320	
*Natural Heritage Program	81,512	
Hunter Safety Program	204,608	
**Environmental Law Enforcement	842,505	
EOEA Network Use Charge	<u>7,429</u>	
Total	3,124,512	33.77%
Other Assessments:		
Retirement Fund	724,396	
Group Insurance and Other Fringe Benefits	445,808	
Medicare Chargeback	<u>14,742</u>	
Total	1,184,946	12.81%
TOTAL EXPENDITURES	9,251,662	100.00%

\*50% of Natural Heritage Program expenditures are charged to Inland Fish and Game Fund; 50% to the Nongame Wildlife Fund.

\*\*15% Assessment for Environmental Law Enforcement expenditures.



# Summary Revenues, Expenditures and Fund Equity

## Nongame Wildlife Fund

July 1, 1991 to June 30, 1992

### REVENUES:

Nongame Wildlife Tax Checkoff Donations	300,415
Fuertes Prints Sales	511
Sales, Other	5,280
Federal Aid Reimbursements	2,791
Direct Donations	22,561
Assoc. Indirect Cost Reimbursements	<u>6,939</u>
TOTAL REVENUES;	338,497

### EXPENDITURES:

Nongame Wildlife Program	353,845
Fringe Benefit Costs	54,376
Natural Heritage Program*	81,512
Comptroller's Adjustment	<u>526</u>
TOTAL EXPENDITURES;	490,259

TOTAL FUND EQUITY;	167,517
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## Other Funds and Programs Expenditures

July 1, 1991 to June 30, 1992

### TRUST FUNDS:

Bald Eagle Trust II	1
Bald Eagle Trust III	<u>9,379</u>
TOTAL EXPENDITURES	9,380

### FEDERAL GRANT:

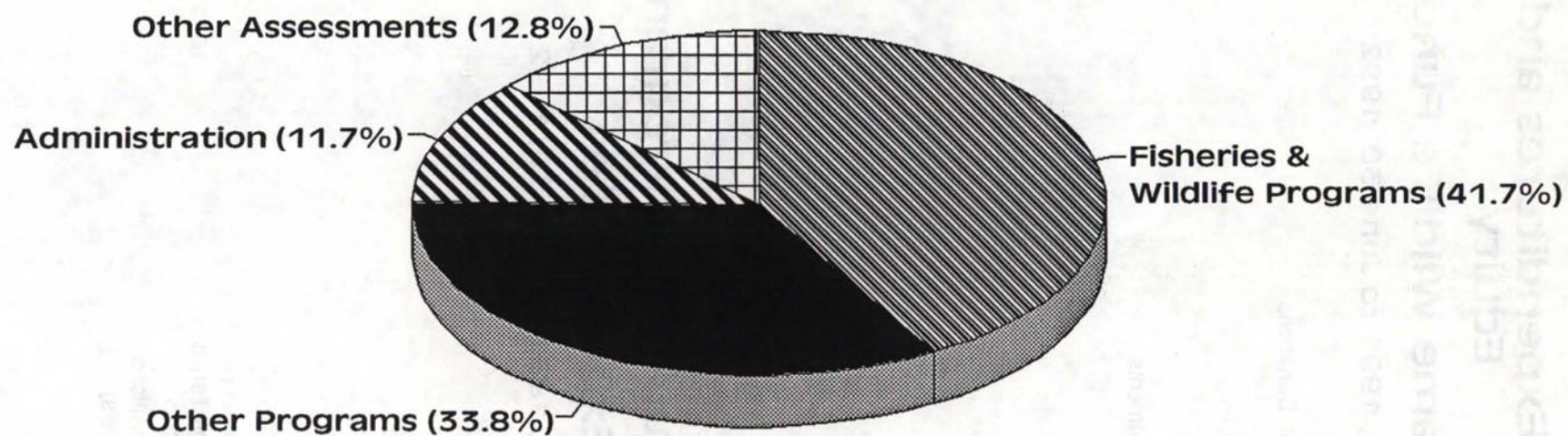
Whetstone Brook Project	26,611
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### CAPITAL OUTLAY FUNDS:

Sunderland Hatchery Reconstruction	19,678
Testing/Removal of Fuel Storage Tanks	950
Sandwich Hatchery Reconstruction	39,720
Cold Water Streams Land Acquisitions	364,000
Cold Water Streams (Assoc. Costs)	11,783
Adjacent Lands Acquisitions	214,059
Adjacent Lands (Assoc. Costs)	11,200
Fuel Tank Removal (Bourne)	<u>1,787</u>
TOTAL EXPENDITURES	663,177

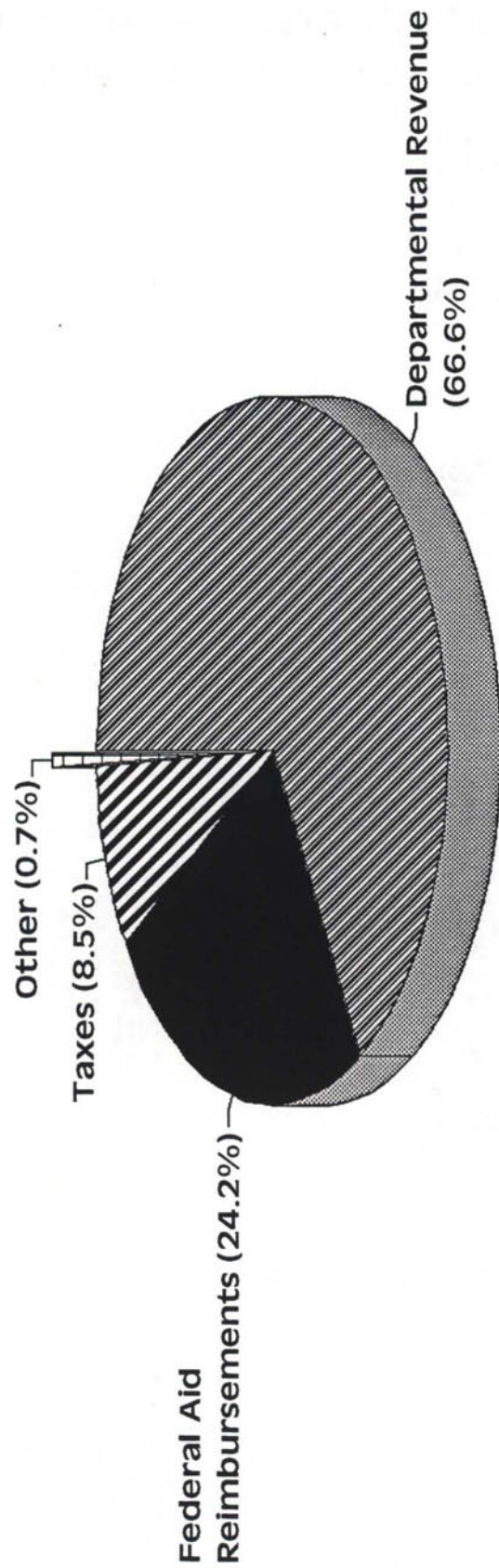


## Expenditures





## Income





# Summary

## Revenue and Fund Equity

### Inland Fish and Game Fund

July 1, 1991 to June 30, 1992

DEPARTMENTAL REVENUES:

Fishing, Hunting and Trapping Licenses	3,838,630
Archery Stamps	170,546
Trap Registrations	649
Waterfowl Stamps, Administration	19,784
Waterfowl Stamps, Ducks Unlimited	29,302
Waterfowl Stamps, Other	58,874
Wildlands Stamps	1,340,638
Antlerless Deer Permits	83,205
Bear Permits	7,430
Turkey Permits	57,945
Special Licenses, Tags and Posters	18,246
Fur Sales	511
Magazine Subscriptions	13,807
Sales, Other	88,029
Fines and Penalties	26,320
Rents	32,798
Prior Year Refunds	3,070
Miscellaneous Income	311
Comptroller's Adjustment	<u>558</u>
Total	5,790,653

FEDERAL AID REIMBURSEMENTS:

Dingell-Johnson (Fisheries)	794,899
Pittman-Robertson (Wildlife)	824,059
Endangered Species	0
Indirect Cost Reimbursements	<u>484,647</u>
Total	2,103,605

TAXES:

Gasoline Tax Apportionment	733,957
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OTHER FINANCIAL SOURCES:

Reimbursement for Half-Price Licenses	63,542
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TOTAL REVENUE;	8,691,758
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TOTAL FUND EQUITY;	4,409,383
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# License and Stamp Sales

July 1, 1991 to June 30, 1992

Type of License/Stamp	Unit Cost	Quantity	Amount
Resident Citizen Fishing	12.50	142,641	1,783,012.50
Resident Citizen Minor Fishing	6.50	5,053	32,844.50
Resident Citizen Fishing (Age 65-69)	6.25	5,386	33,662.50
Resident Cit. Fishing (Over 70, etc.)	FREE	5,918	0.00
Resident Alien Fishing	14.50	2,486	36,047.00
Non-Res. Citizen/Alien Fishing	17.50	9,238	161,665.00
Non-Res. Citizen/Alien Fishing (7 day)	11.50	2,231	25,656.50
Duplicate Fishing	2.00	1,190	2,380.00
Resident Citizen Trapping	20.50	388	7,954.00
Resident Citizen Minor Trapping	8.50	16	136.00
Resident Citizen Trapping (Age 65-69)	10.25	36	369.00
Non-Res. Trapping	300.00	0	0.00
Duplicate Trapping	2.00	2	4.00
Resident Citizen Hunting	12.50	35,774	447,175.00
Resident Citizen Hunting (Age 65-69)	6.25	599	3,743.75
Resident Citizen Hunting (Paraplegics)	FREE	220	0.00
Resident Alien Hunting	19.50	797	15,541.50
Non-Res. Cit./Alien Hunting (Big Game)	48.50	1,717	83,274.50
Non-Res. Cit./Alien Hunting (Sm. Game)	23.50	1,248	29,328.00
Non-Res. Cit./Alien C.S.P. Hunting (3 day)	19.50	179	3,490.50
Duplicate Hunting	2.00	475	950.00
Resident Citizen Sporting	19.50	61,322	1,195,779.00
Resident Citizen Sporting (Age 65-69)	9.75	2,693	26,256.75
Resident Citizen Sporting (Over 70)	FREE	18,080	0.00
Duplicate Sporting	2.00	475	950.00
TOTAL LICENSE SALES (GROSS)		298,164	3,890,220.00
Archery/Primitive Firearm Stamps	5.10	34,066	173,736.60
Collectors (Archery Stamps)			216.10
Collection of Shortages			7,253.05
Collection of Bad Debts			29,484.80
Fees Retained by Clerks			-78,523.25
Refunds			-13,211.39
Trap Registrations			649.30
Waterfowl Stamps	5.00	19,713	98,565.00
Collectors (Waterfowl Stamps)			12,900.00
Fees Retained by Clerks			-3,505.65
Wildlands Stamps	5.00	267,874	1,339,370.00
Collectors, Donations Wildlands Stamps			1,268.29
TOTAL LICENSE/STAMP SALES (NET)		619,817	5,458,422.85



Year	Month	Day	Event
1942	Jan	1	Birth of John Doe
1942	Feb	15	Marriage of John and Jane Doe
1942	Mar	1	Death of John Doe
1942	Apr	1	Birth of Jane Doe
1942	May	1	Marriage of Jane and John Doe
1942	Jun	1	Death of Jane Doe
1942	Jul	1	Birth of John Doe
1942	Aug	1	Marriage of John and Jane Doe
1942	Sep	1	Death of John Doe
1942	Oct	1	Birth of Jane Doe
1942	Nov	1	Marriage of Jane and John Doe
1942	Dec	1	Death of Jane Doe
1943	Jan	1	Birth of John Doe
1943	Feb	15	Marriage of John and Jane Doe
1943	Mar	1	Death of John Doe
1943	Apr	1	Birth of Jane Doe
1943	May	1	Marriage of Jane and John Doe
1943	Jun	1	Death of Jane Doe
1943	Jul	1	Birth of John Doe
1943	Aug	1	Marriage of John and Jane Doe
1943	Sep	1	Death of John Doe
1943	Oct	1	Birth of Jane Doe
1943	Nov	1	Marriage of Jane and John Doe
1943	Dec	1	Death of Jane Doe







